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Armed Services Technical Information Agency

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1 OF 3

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Serial No. 12

SECRET

File No.

Report No. NA-56-454

NORTH AMERICAN AVIATION, INC.

INTERNATIONAL AIRPORT
LOS ANGELES 45 CALIFORNIA

ENGINEERING DEPARTMENT

DEVELOPMENT PLAN REPORT

FOR THE

SPECIAL RECONNAISSANCE AIRPLANE

WEAPON SYSTEM 118P

CONTRACT AF33(600)-31243

(E.O. NO. 55-3-118L)

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FC

PREPARED BY

DESIGN ANALYSIS GROUP

APPROVED BY

H. A. Evans

H. A. Evans, Chief Designer

No. of Pages i, ii, iii 1 thru 114

Date 4 June 1956

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56RDZ-6557-12

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PHASE III

OPERATIONAL DATE

PHASE II 1/2	PHASE III
1961	1963

INTRODUCTION

This system development plan presents ~~in~~ the planning for a system providing the best possible solution to the requirements stated in AF33(600)-31243.

Estimated schedules for the over-all system and the component parts are included, and indicate that this system will be available for operational use in 1961 (Phase II 1/2) and 1963 (Phase III).

In order to meet the schedule, funds, facilities, and decisions or approvals are required as shown.

PART I - GENERAL

PART I - GENERAL

A. STATEMENT OF THE PROBLEM

The purpose is to design a special reconnaissance weapon system for use in tactical and strategic reconnaissance operations. Particular emphasis is placed on capabilities of accurate data procurement by use of daylight photography, high-order ferret, and high-resolution radar reconnaissance, Emphasis is also placed on maximum survival and minimum cost, with a high degree of weapon system reliability.

B. APPROACH

The approach is consistant with the purpose, that is, to obtain the optimum weapon system for maximum reconnaissance results, operational capability, survival, and reliability with minimum cost, development time, maintenance, and gross weight of the air-borne vehicle. With the purpose established, the minimum requirements that this system must have become apparent. With the operational time established, the state of the art commands a finite quality of the weapon system which becomes limited by the state of the art in terms of the technology. These conditions describe a family of airplanes which, through design layout work, analytical investigation, and systematic configuration analysis using the IBM 701 high-speed digital computer, are represented by the designs for Phase II-1/2 and Phase III presented herein.

The following "ground rules" have been arrived at to obtain the optimum weapon system.

a. The number of airplanes to be procured is relatively few. This results in a custom-type production line as opposed to the mass production line.

b. The maintenance and operational crew are specialized and of Air Force Test Center calibre.

c. Deviations, maintaining a high degree of capability, are made from Air Force Specifications.

d. Through the refinements outlined above, a lighter and higher-performance type airplane results, with the following:

1. A limit load factor of 1.6 is adequate for this type of airplane with high altitude performance.

2. Minimum equipment weight is obtained for the capabilities required for this system.

3. Structural refinements such as the reduction of access doors to a minimum number, are incorporated.

C. SOLUTION

1. Preparation of Engine Data

The various engine and fuel manufacturers were contacted to determine the state of the art in the required time period and to obtain from them data on engines that are being studied and developed. On the basis of these data, the contractor estimated the installed weights and performance characteristics suitable for the calculation of aircraft performance. A comparison chart was prepared as an aid in the selection of the proper engine-fuel combination. Fuel studies were conducted with relation to inherent characteristics such as boiling and cracking temperatures. Fuel pressures, structures, and insulation requirements were also investigated. Investigations were conducted with various types of inlets best suited for each design.

2. Weight Estimation Procedure

It is expected that this system will result in an airplane that will differ somewhat from current aircraft in regard to both type of structure and materials. Investigations have been conducted on these items in sufficient detail to estimate gross weights. This involved contacting material suppliers. Design testing and fabrication work of related projects that the Contractor is involved in are very helpful in this step. Static and dynamic loading along with thermal requirements of the designs were investigated to determine type and quantity of materials necessary.

3. Investigation of Old and New Aerodynamic Features

Existing aerodynamic test data applicable to this class of aircraft were analyzed and correlated to provide a basis for calculating performance capability. This supplemented the contractor's present data for calculating performance. NAA NAVAHO intercontinental missile experience, related development projects, and test results are great assets to this development. The contractor and NACA test data were used extensively to arrive at the present aerodynamic configuration.

4. Investigation of Equipment

A survey was made of the equipment manufacturers to determine the weight and space requirements of equipment meeting the performance characteristics given in the work statement. A comprehensive study was made on the reconnaissance subsystems.

The results are discussed in the "Reconnaissance Subsystem, Weapon System 118P," Report No. NA-56-372, and the "Equipment Survey, Weapon System 118P," Report No. NA-56-446.

5. Airframe Design

Layouts were made of various aircraft arrangements which appeared promising. Emphasis was placed on the structural design operational characteristics, maintenance and servicing provisions, and production capability. Experience gained on other projects is very helpful in this step; however, the advanced performance requirements in terms of high-altitude operation with attendant high-speed operation necessitate a large volume of analytical work on stress, aeroelasticity, control systems, and cooling systems to supplement the layout work, Designs were prepared around the most promising combinations of engines, fuels and aerodynamic features investigated. These designs have been carried far enough to permit the selection of a particular combination. Balance, stability, and control computations were made to ensure that these items are satisfactory. Layouts have been made of such items as crew provisions, armament, fuel equipment, power plants, and landing gear in sufficient detail to ensure adequate space for operation and maintenance.

6. Base-point Airplanes

Estimates were made of a number of aircraft designs for fulfilling each of the design points called for in the work statement. These estimated airplanes were laid out and detail weight estimates and performance calculations computed for each of the designs. These are used as base points in each succeeding step.

7. Configuration Analysis

The base-point airplanes usually have certain performance deficiencies and will not be minimum weight designs. The purpose of the configuration analysis step is to modify the design in whatever way may be necessary to satisfy the performance requirements with the least take-off gross weight for each particular engine airframe arrangement. Various requirement trade-offs are also analyzed to facilitate the selection of the optimum design. Engine data are also "rubberized" to determine the optimum number and size required.

The configuration analysis program utilizes the IBM 701 computer and is prepared to systematically vary such parameters of the base-point airplanes as engine size, wing loading, aspect ratio, sweep, thickness ratio, and arriving at the fuel load and gross weight of the airplane required to meet a set of requirements coded into the program. These requirements are supersonic cruise altitude and speed, design range, etc. Each of the thousands of combinations of these parameters that define an airplane are "flown" in a mission profile. The program searches for the minimum weight configuration to meet or exceed the requirements. The best designs determined are then laid out to check all practical aspects of the computed designs and eliminate those that show poor arrangements. The remaining designs, (check-point airplanes) are again processed through detail weight and performance calculations. These "check-points," encompassing various power plants and design features, are again screened for the best design. Detail refinements and promising features of the other design are then incorporated, if possible, into the optimum design. The configuration analysis procedure is repeated until a final design is determined.

D. LOGISTICS

The concept of logistics and the approach to ground support for Weapon System 118P varies with the operational base suitability and the study phase. Missions requiring departure, shuttle, or termination of flight at nonpermanent installations would involve capacity air transportation in addition to problems in fuel logistics for the Phase III study.

Problem areas in logistics include:

1. Reconnaissance pod handling (a minimum of five, and a maximum of 11 pod configurations with an additional 2000 pounds of modular equipment for modified technical ferret operation).

2. Ground data correlation (equipment and data processing logistics)

3. Phase III fuel servicing

Reconnaissance pod handling is complicated by the number, configuration, and required automaticity of the equipment and the pods. Aircraft performance requirements dictate mission breakdown of equipment, which necessitates many separate units or pods to accomplish the whole mission. An approximate figure per pod for the Phase II-1/2 study is 352 cubic feet at 1000 pounds Six pods could be transported in a C-133 type airplane. For the inclusion of technical ferret capabilities, two C-133 type airplanes would be required to transport the reconnaissance pod complement for Weapon System 118P. The van-type ground data correlation equipment would require approximately three N-2, N-3, or K-55 type vans. The inclusion of inflight data correlation could reduce this number by one. The mission termination point and data correlation areas would require shuttling of data to a common data compilation area to enable evaluation of total mission information.

Limited availability of the fuel for the Phase III study requires special logistic considerations. Support aircraft similar to the C-133 type could carry the proposed 50,000-gallon-capacity liquid hydrogen tanks. Boil-off of the liquid hydrogen in transit requires a portable reliquification plant at the servicing area. The problem would be to establish a shuttle link between the strategically located

hydrogen generating plants and the Weapon System 118P realm of operations. Presently, development work at another agency is under way toward the development of portable hydrogen generating plants. The state of the art in this field is embryonic, and it is unknown whether the capacity of a portable plant could readily satisfy the volume of fuel required for Weapon System 118P.

The design requirement of "hands-off" maintenance limits maintenance support to the logistical support of preflight and minor maintenance equipment requirements. The support phase of Weapon System 118P could be handled using five C-133 type airplanes.

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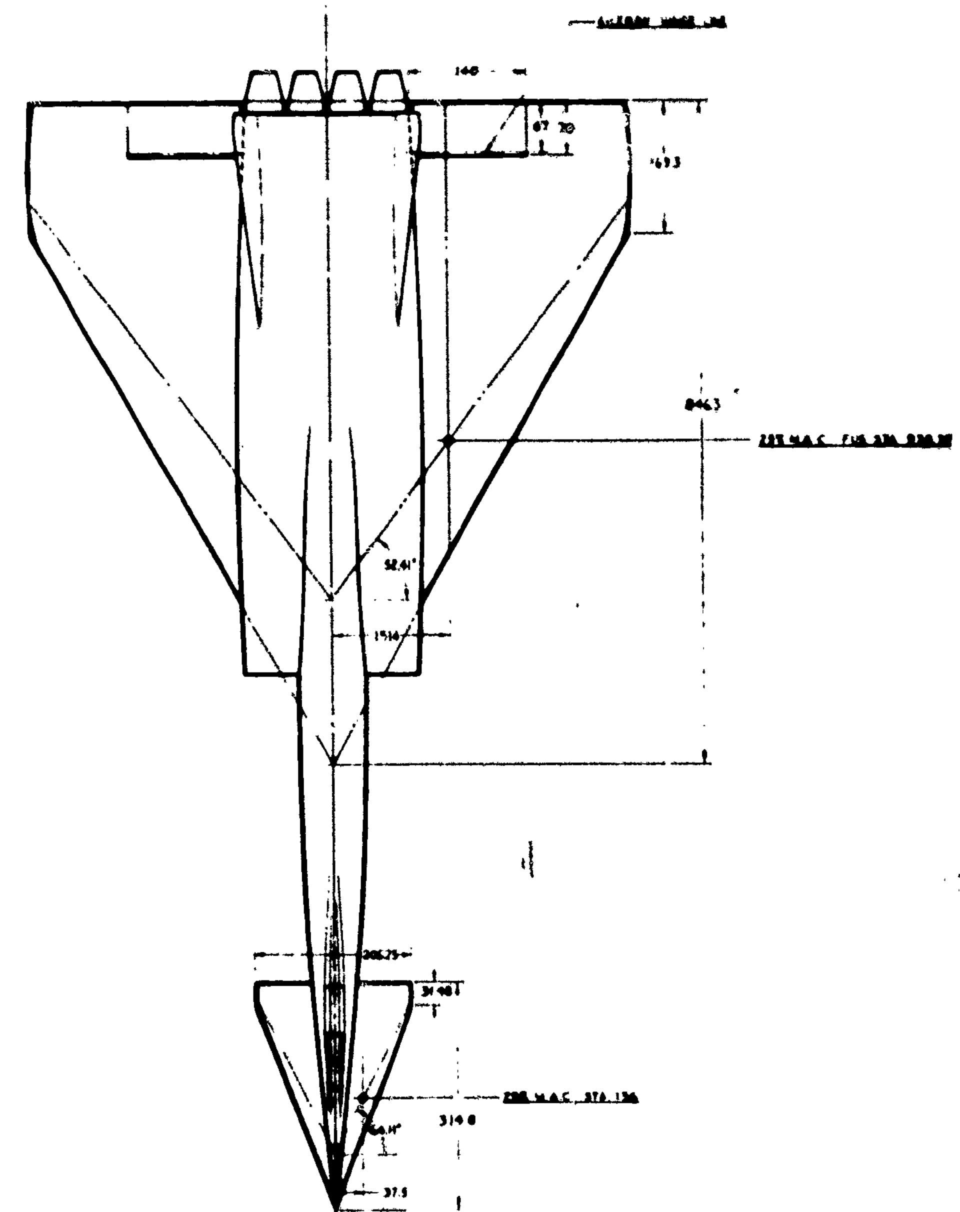


DIMENSIONAL DATA

WING	
AREA	2757 SQ. FT.
ASPECT RATIO	1.528
TAPER RATIO	0.2
SWEEPBACK (25% ELEMENT)	52.41°
AIRFOIL SECTION	NACA 66003 (NAA MOD.
M.A.C. LENGTH	5830 IN.
AILERON AREA 64.36 SQ. FT. EACH	DEFLECTION 15° UP 15° DOWN
CANARD SURFACE (EXPOSED)	
AREA	174.91 SQ. FT.
ASPECT RATIO	1.147
TAPER RATIO	0.119
SWEEPBACK (25% ELEMENT)	64.11°
AIRFOIL SECTION	NACA 66003 (NAA MOD.
M.A.C. LENGTH	211.8 IN

VERTICAL TAIL	
AREA	160 SQ. FT. EACH
ASPECT RATIO	0.763
TAPER RATIO	0.1
SWEEPBACK (25% ELEMENT)	58.13°
AIRFOIL SECTION	NACA 66003 (NAA MOD.)
M.A.C. LENGTH	212.5 IN
RUDDER AREA	32.0 SQ. FT. EACH

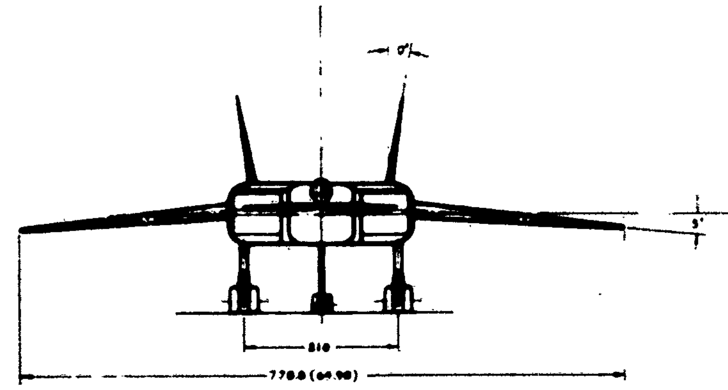
GENERAL DATA

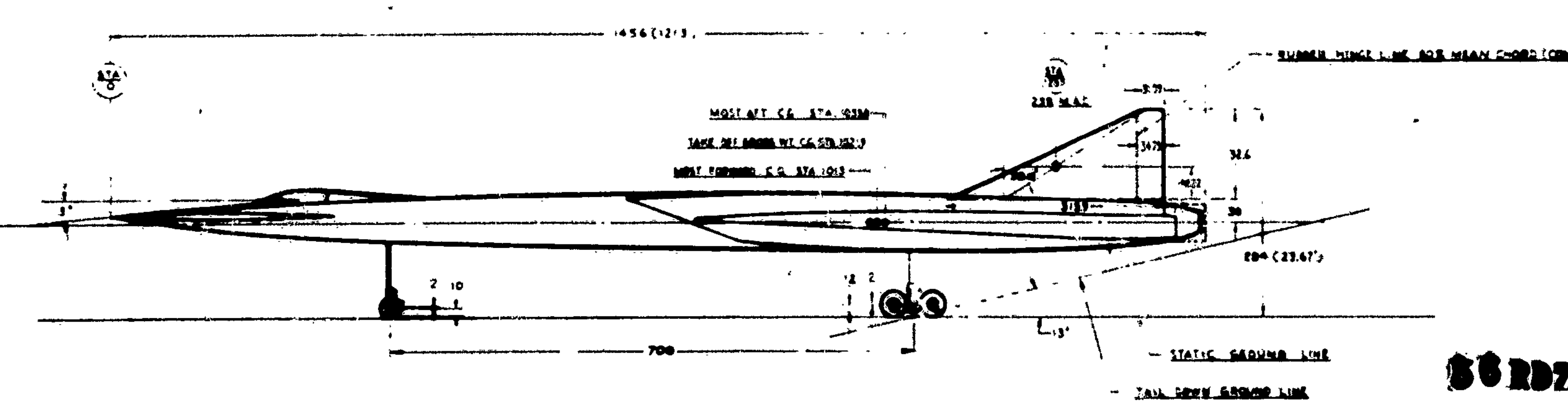
MAIN ALIGHTING GEAR
36 x 11 TYPE VII FOUR WHEEL BOGIE

AUXILIARY ALIGHTING GEAR
26 x 6.6 TYPE VII DUAL

ENGINE DESIGNATION
FOUR GE X278

TAKE-OFF GROSS WEIGHT 207,800 LB.
USEFUL LOAD (BASIC MISSION) 124,136 LB.





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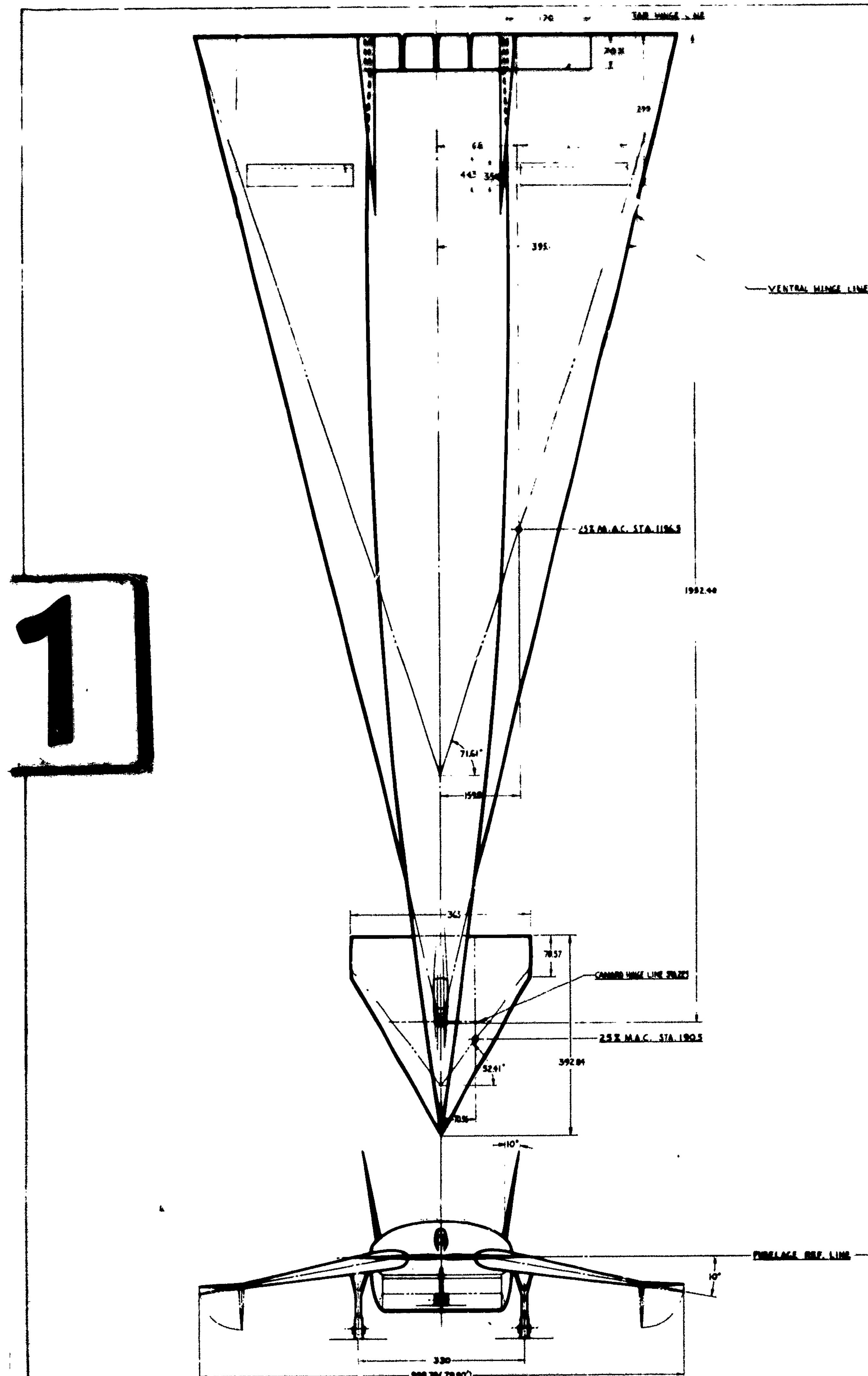
GENERAL ARRANGEMENT
SYSTEM 118P PHASE II ½

D265-1

56-SMRL-935



DIMENSIONAL DATA

WING

AREA (INCL VENTRALS)	6600 SQ. FT.
ASPECT RATIO	0.9672
TAPER RATIO	0.0
SWEEPBACK (25% ELEMENT)	71.61°
AIRFOIL SECTION	NACA 66003 (N.A.A. MOD)
M.A.C. LENGTH	1301.6 IN.
SPOILER AREA 65.29 SQ.FT. EA.	DEFLECTION 60°
DEFLECTOR AREA 52.23 SQ.FT. EA.	DEFLECTION 60°
TRIM TAB AREA 83.0 SQ.FT.	DEFLECTION ±10°

VERTICAL TAIL

AREA	250 SQ.FT EACH
ASPECT RATIO	0.906
TAPER RATIO	0.334
SWEEPBACK (25% ELEMENT)	52.41°
AIRFOIL SECTION	NACA 66003 (N.A.A. MOD)
M.A.C. LENGTH	231.11 IN.
RUDDER AREA	45.25 SQ.FT. EACH

CANARD SURFACE (EXPOSED)

AREA	434.77 SQ. FT.
ASPECT RATIO	1.439
TAPER RATIO	0.232
SWEEPBACK (25% ELEMENT)	52.41°
AIRFOIL SECTION	NACA 66003 (N.A.A. MOD)
M.A.C. LENGTH	235.6 IN.

VENTRAL

AREA	102 SQ.FT EACH
ASPECT RATIO	0.499
TAPER RATIO	0.0
SWEEPBACK (25% ELEMENT)	71.61°
AIRFOIL SECTION	NACA 66003 (N.A.A. MOD)
M.A.C. LENGTH	228.83 IN.

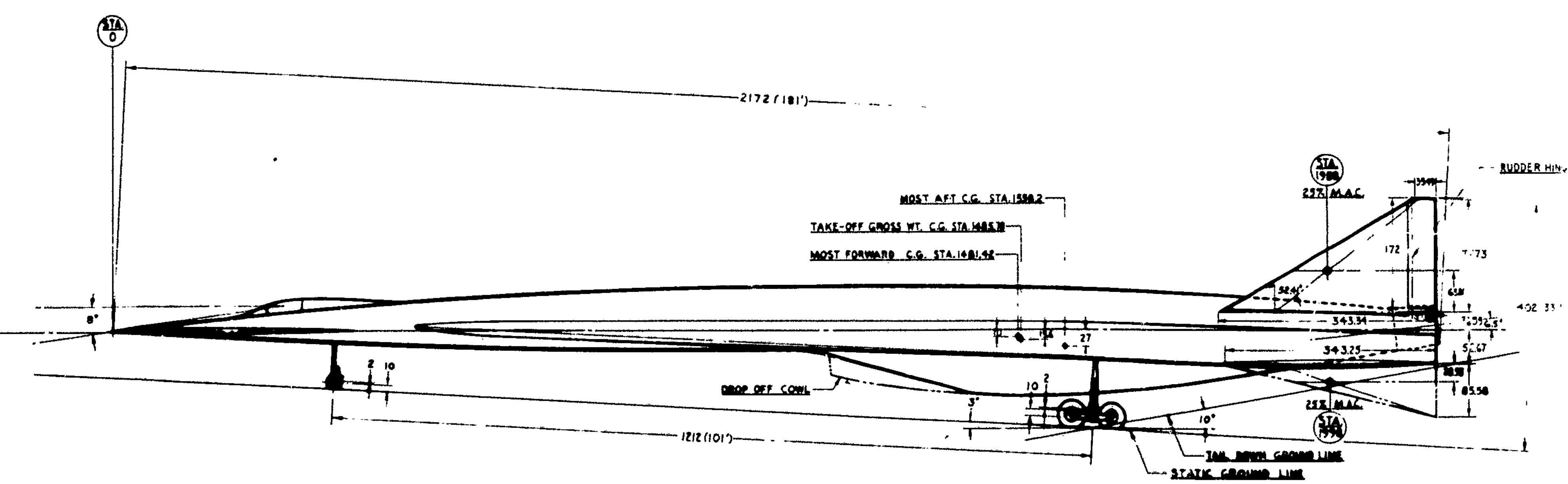
GENERAL DATA

MAIN ALIGHTING GEAR
46 x 14 TYPE VII TANDEM

AUXILIARY ALIGHTING GEAR
24 x 5.5 TYPE VII DUAL

ENGINE DESIGNATION
FOUR 103.1% HYDROGEN AIR TURBO ROCKET

TAKE-OFF GROSS WEIGHT 206,800 LB.
USEFUL LOAD (BASIC MISSION) 63,958 LB.



NA-56-454

DIMENSIONAL DATA

WING

AREA (INCL VENTRALS)	6600 SQ. FT.
ASPECT RATIO	0.9672
TAPER RATIO	0.0
SWEEPBACK (25% ELEMENT)	71.61°
AIRFOIL SECTION	NACA 66003 (NAA MOD)
M.A.C. LENGTH	1301.6 IN.
SPOILER AREA 65.29 SQ.FT. EA.	DEFLECTION 60°
DEFLECTOR AREA 52.23 SQ.FT. EA.	DEFLECTION 60°
TRIM TAB AREA 63.0 SQ.FT.	DEFLECTION ±10°

VERTICAL TAIL

AREA	250 SQ.FT. EACH
ASPECT RATIO	2.906
TAPER RATIO	0.1034
SWEEPBACK (25% ELEMENT)	52.41°
AIRFOIL SECTION	NACA 66003 (N.A.A. MOD)
M.A.C. LENGTH	231.11 IN.
RUDDER AREA	45.25 SQ.FT. EACH

CANARD SURFACE (EXPOSED)

AREA	434.77 SQ.FT.
ASPECT RATIO	1.439
TAPER RATIO	0.232
SWEEPBACK (25% ELEMENT)	52.41°
AIRFOIL SECTION	NACA 66003 (NAA MOD)
M.A.C. LENGTH	235.6 IN.

VENTRAL

AREA	102 SQ. FT. EACH
ASPECT RATIO	0.499
TAPER RATIO	0.0
SWEEPBACK (25% ELEMENT)	71.61°
AIRFOIL SECTION	NACA 66003 (N.A.A. MOD)
M.A.C. LENGTH	228.83 IN.

GENERAL DATA

MAIN ALIGHTING GEAR
46 x 14 TYPE VII TANDEM

AUXILIARY ALIGHTING GEAR
24 x 5.5 TYPE VII DUAL

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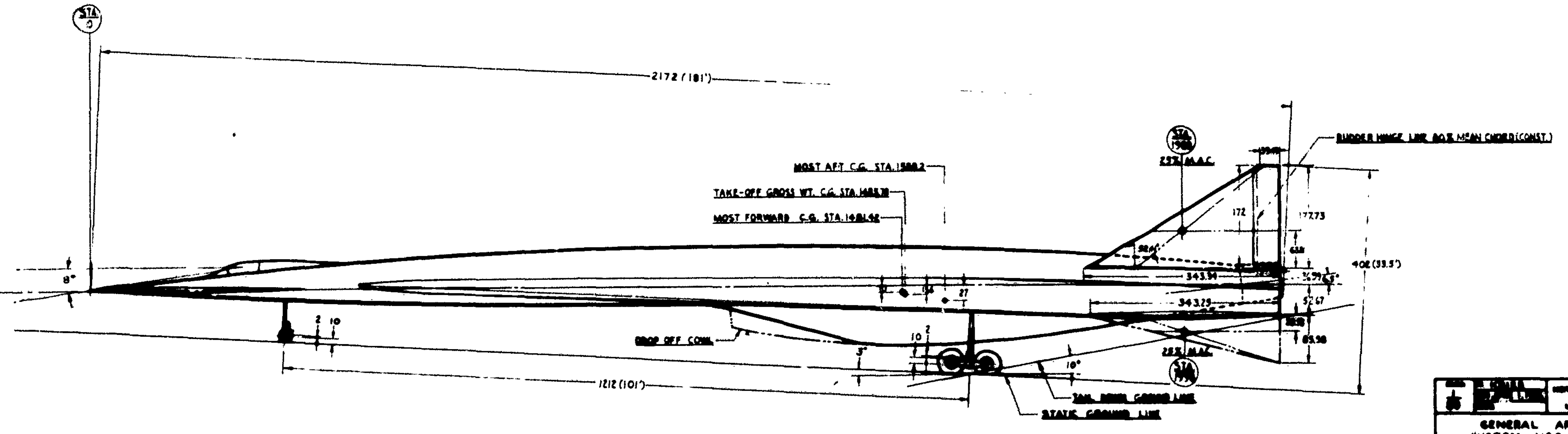

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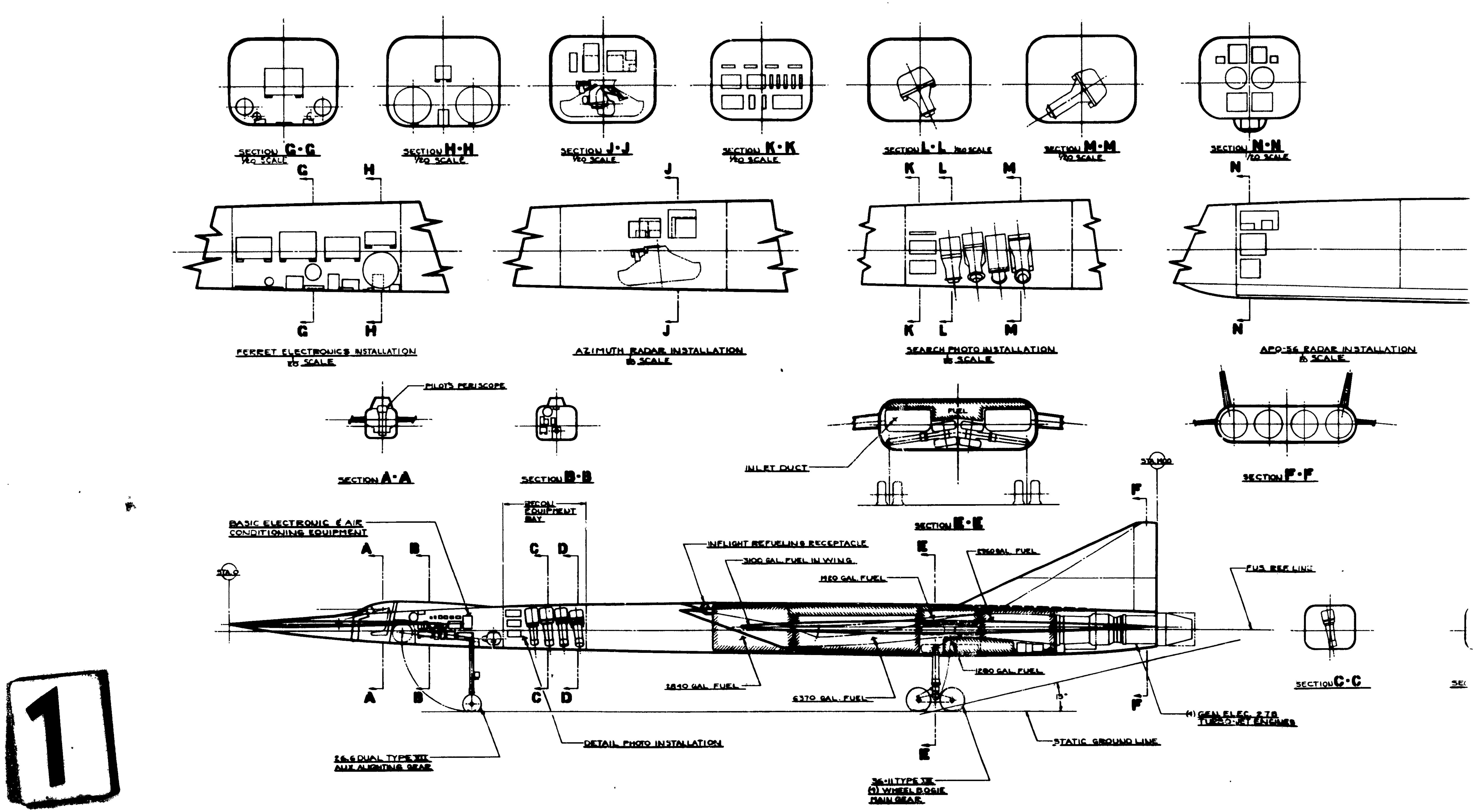
GENERAL ARRANGEMENT
SYSTEM 118P PHASE III

D265-2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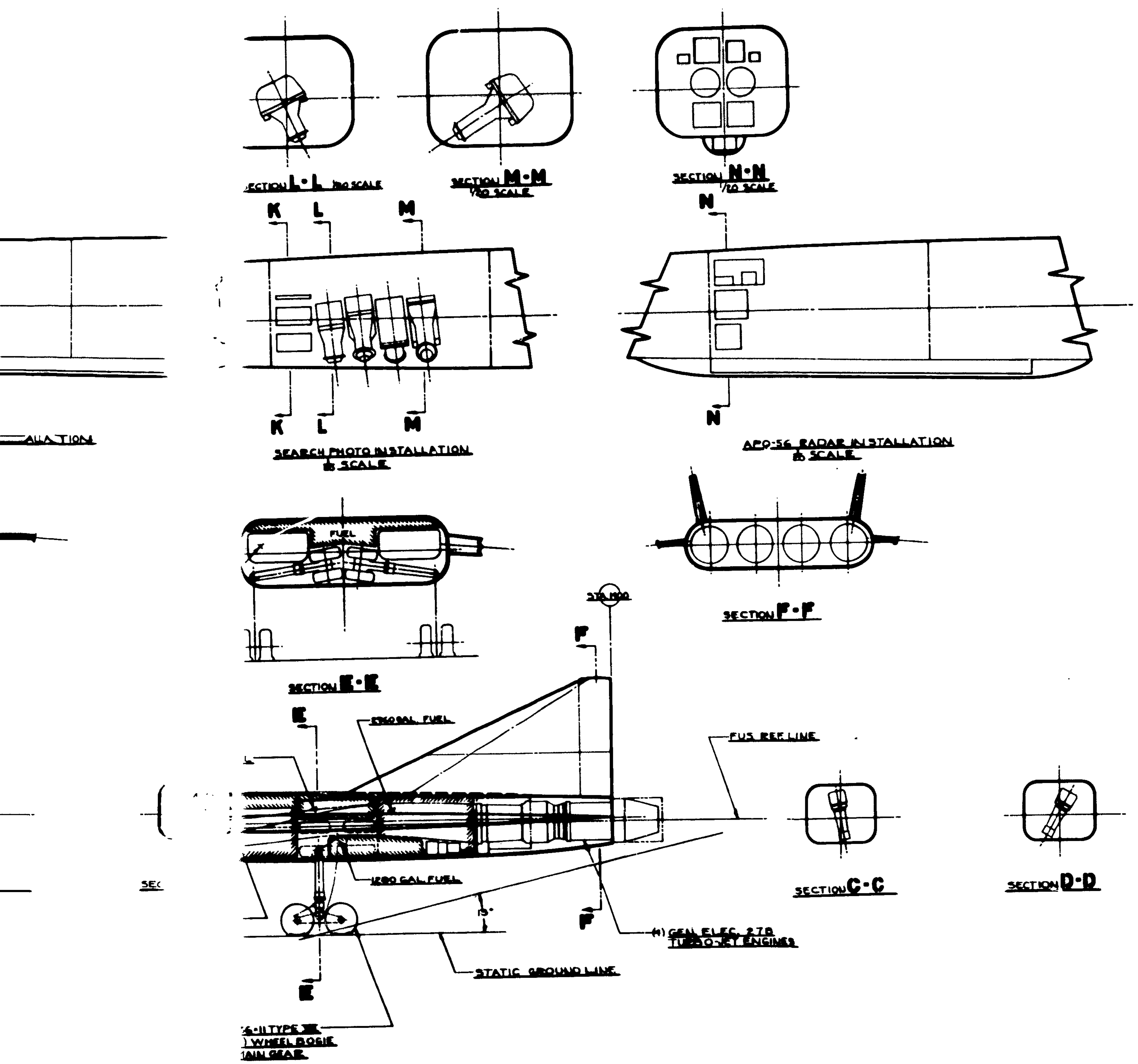
SECTION H-H 1/20 SCALE
SECTION J-J 1/20 SCALE
SECTION K-K 1/20 SCALE
SECTION L-L 1/20 SCALE
SECTION M-M 1/20 SCALE
SECTION N-N 1/20 SCALE
FERRET ELECTRONICS INSTALLATION 1/20 SCALE
AZIMUTH RADAR INSTALLATION 1/20 SCALE
SEARCH PHOTO INSTALLATION 1/20 SCALE
APQ-56 RADAR INSTALLATION 1/20 SCALE
PILOTS PERISCOPE
SECTION A-A
SECTION B-B
FUEL
INLET DUCT
SECTION E-E
SECTION F-F
STA 1100
BASIC ELECTRONIC & AIR CONDITIONING EQUIPMENT
EQUIPMENT BAY
INFLIGHT REFUELING RECEPTACLE
3100 GAL. FUEL IN WING
1120 GAL. FUEL
2560 GAL. FUEL
FUS. REF. LINE
STA 0
2840 GAL. FUEL
6370 GAL. FUEL
1280 GAL. FUEL
SECTION C-C
(4) GEN. ELEC. J-78 TURBO-JET ENGINES
DETAIL PHOTO INSTALLATION
STATIC GROUND LINE
26-6 DUAL TYPE VII AUX ALIGHTING GEAR
36-11 TYPE VII (4) WHEEL BOGIE MAIN GEAR
1



EQUIPMENT LIST

BASIC ELECTRONICS (CARRIED ON ALL MISSIONS)
- ARC-52 UHF COMM.
- ARA-37(XN-1) UHF D/F
- ANH-5 RECORDER
- APX-19 A/G IFF(XP)
- APX-27 A/A IFF(XP)
- ART-27 CRASH LOCATOR BEACON
- AUTOMATIC FLIGHT CONTROL SYSTEM
- NSC AUTONAVIGATOR
- STANDBY PLATFORM

RECON. EQUIPMENT
- DETAIL PHOTO
  - (4) 48 INCH FOCAL LENGTH 9×18 FORMAT CAMERAS
- SEARCH PHOTO
  - (2) 30 INCH FOCAL LENGTH 9×9 FORMAT CAMERAS
  - (2) 18 INCH FOCAL LENGTH 9×18 FORMAT CAMERAS
- MAPPING RADAR
  - APQ-56 SIDE LOOKING RADAR
- MAPPING RADAR
  - AZIMUTH SCAN RADAR
- FERRET ELECTRONICS
  - DLD-2 D/F EQUIPMENT
  - DLD-1 D/F EQUIPMENT
  - CW D/F EQUIPMENT
  - EHF D/F EQUIPMENT

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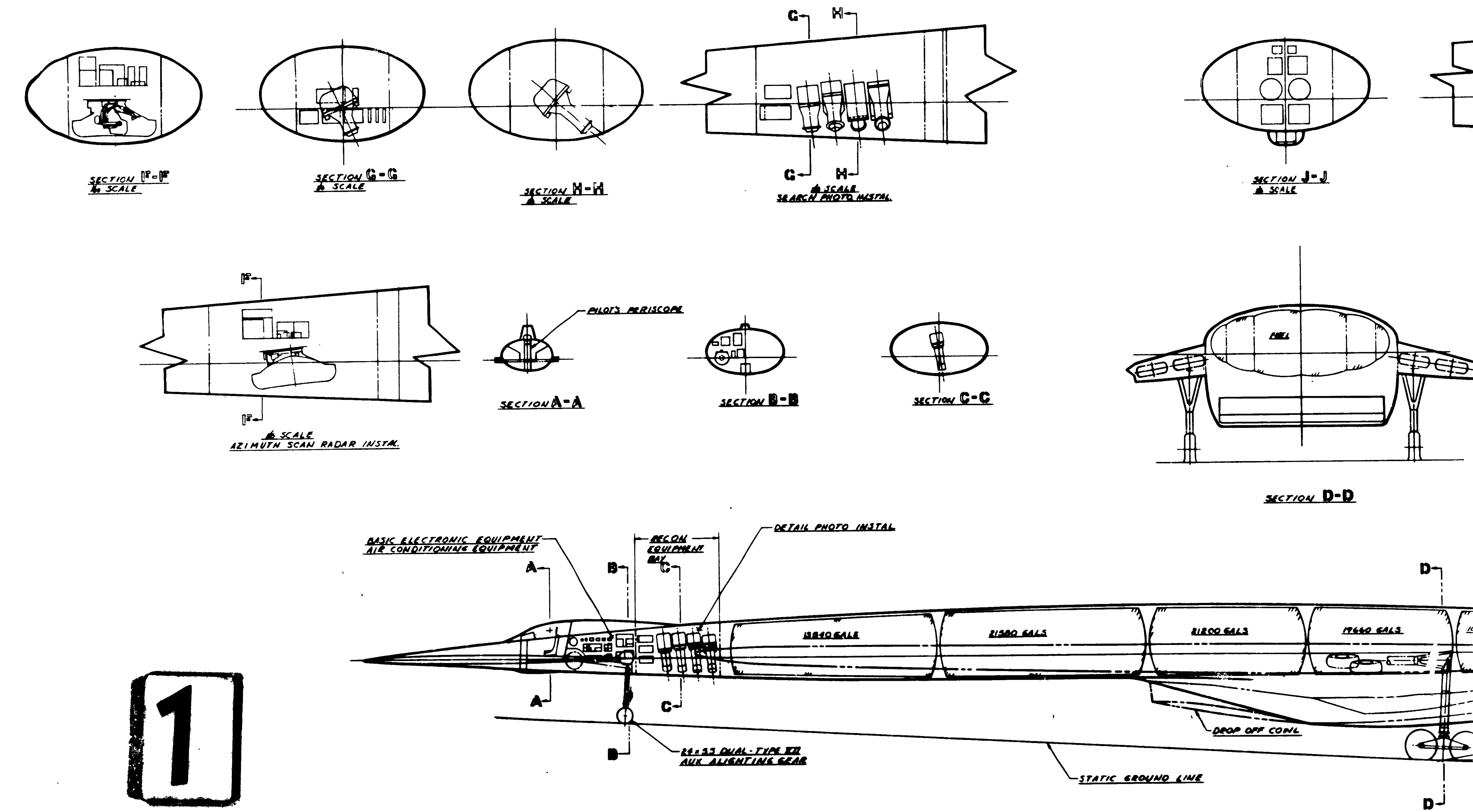
TOTAL FUEL CAPACITY 17,970 GAL.

INBOARD PROFILE - RECON. SYS 118P PHASE II½ | D265-26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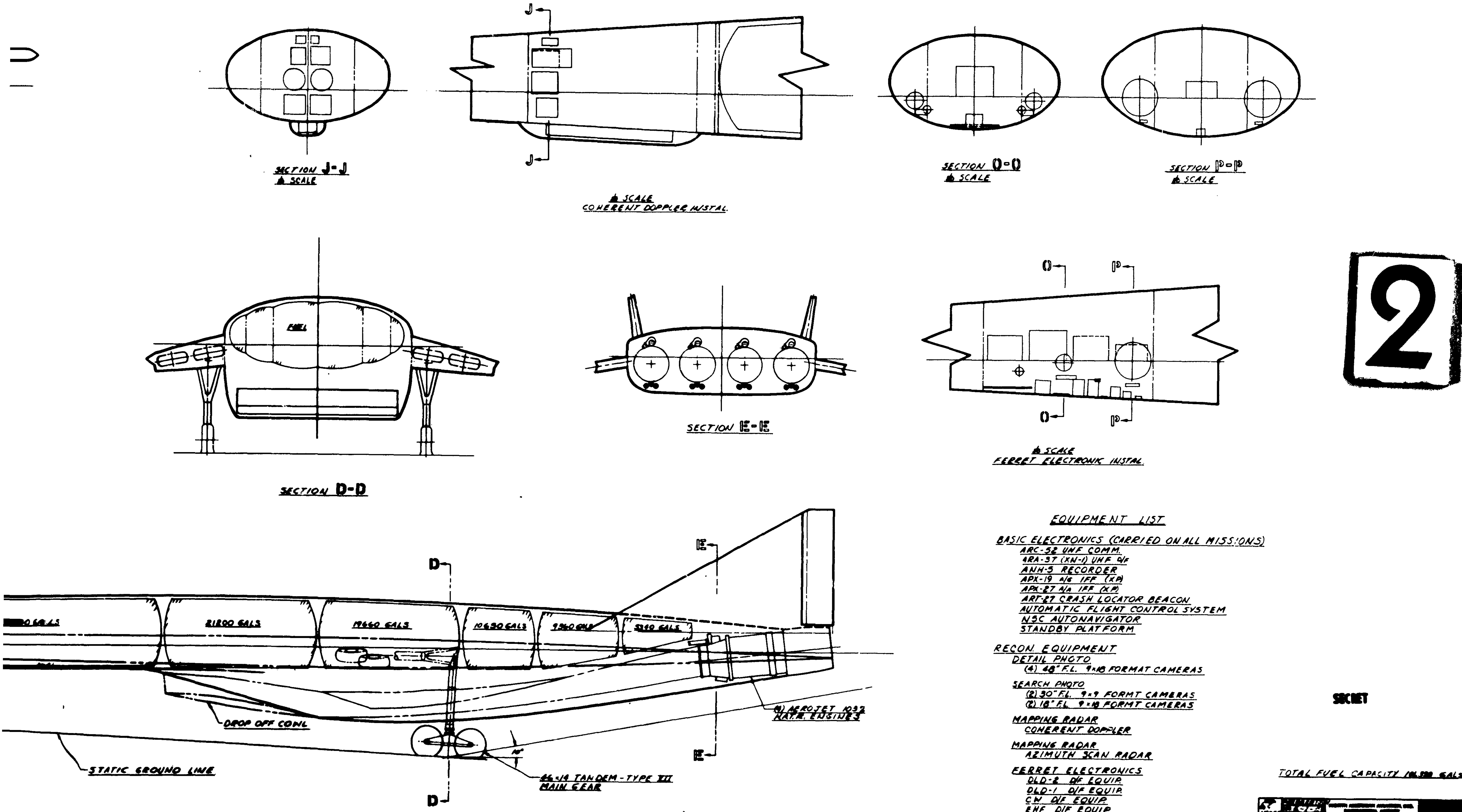
SEARCH PHOTO INSTAL.
SECTION J-J
SCALE
F
SCALE
AZIMUTH SCAN RADAR INSTN.
PILOT'S PERISCOPE
SECTION A-A
SECTION B-B
SECTION C-C
FUEL
SECTION D-D
BASIC ELECTRONIC EQUIPMENT
AIR CONDITIONING EQUIPMENT
RECON EQUIPMENT BAY
DETAIL PHOTO INSTAL
A
B
C
D
13840 GALS
21580 GALS
21200 GALS
19660 GALS
DROP OFF COWL
24 x 53 DUAL-TYPE VII
AUX ALIGHTING GEAR
STATIC GROUND LINE
1



EQUIPMENT LIST

BASIC ELECTRONICS (CARRIED ON ALL MISSIONS)
- ARC-52 UHF COMM.
- ARA-37 (XN-1) UHF D/F
- ANH-5 RECORDER
- APX-19 N/G IFF (XP)
- APX-27 N/A IFF (XP)
- ART-27 CRASH LOCATOR BEACON
- AUTOMATIC FLIGHT CONTROL SYSTEM
- NSC AUTONAVIGATOR
- STANDBY PLATFORM

RECON. EQUIPMENT
- DETAIL PHOTO
  - (4) 48" F.L. 9×18 FORMAT CAMERAS
- SEARCH PHOTO
  - (2) 30" F.L. 9×9 FORMT CAMERAS
  - (2) 18" F.L. 9×18 FORMT CAMERAS
- MAPPING RADAR
  - COHERENT DOPPLER
- MAPPING RADAR
  - AZIMUTH SCAN RADAR
- FERRET ELECTRONICS
  - DLD-2 D/F EQUIP.
  - DLD-1 D/F EQUIP.
  - CW D/F EQUIP.
  - EHF D/F EQUIP.

SECRET

TOTAL FUEL CAPACITY 116,380 GALS

INBOARD PROFILE-RECON. SYSTEM : ?P PHASE III

D265-27

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PART II - DESCRIPTION

The Phase II-1/2 and Phase III airplanes were designed to fulfill the requirement for a special reconnaissance weapon for use in tactical and strategic reconnaissance operations. The operational availability date for the Phase II-1/2 airplane is 1961, and for the Phase III airplane 1963.

The Phase II-1/2 airplane is powered by four General Electric X278 turbojet engines using JP-5 fuel. All fuel is stored internally and totals 120, 399 pounds. The airplane is operated by a crew of one and will cruise at an altitude of 75, 000 feet at Mach 3. 2, having a range of 3000 nautical miles.

The Phase III airplane is powered by four aero-jet turbo-rocket engines using liquid hydrogen fuel. All fuel is internally stored and totals 59, 278 pounds. The airplane is operated by a crew of one and will cruise at an altitude of 100, 000 feet at Mach 4. 0, having a range of 3000 nautical miles.

A. AIR-BORNE SYSTEMS

1. Airframe

a. Configuration

(1) Cooling and Ventilating System

(a) Phase II-1/2

Several cooling systems were investigated for the Phase II-1/2 Weapon System 118P. The integrated cooling arrangement which appears to be most favorable is basically a recirculating system, making use of the latent heat of vaporization of water as a heat sink via a water boiler heat exchanger. Make-up air for leakage is provided by a conventional air cycle system in which the air is cooled by performing work in a refrigeration turbine. A ram system is provided for emergency operation.

Both cabin and electronic equipment will be pressurized in order to provide adequate environmental conditions for pilot comfort and equipment operation. The make-up system bleeds air from the engine compressors. The air then goes through three successive reductions in temperature via a ram-air heat exchanger, a water boiler heat exchanger, and a turbine. The work from the turbine is absorbed by a compressor which recirculates air back to the upstream side of the ram-air heat exchanger, and provides hot air to mix with the cold air discharged from the turbine, in order to provide temperature control. The mixed air is then provided to equipment which requires air controlled to a narrow temperature band. Where there is appreciable difference in the temperature levels of these items, additional mixing valves may be used with individual temperature controls. This air may then be discharged either into the cabin or elsewhere in the main system. A by-pass and pressure-limiting valve are also provided to supply additional air to make up leakage, on the assumption that this will be needed.

Consideration may be given to an optional make-up system which would replace the water boiler and turbine arrangement by a single boiler, making use of an aqueous ammonia solution mixed in the right proportions to give the desired boiling temperature throughout he altitude range required. This would increase the dependability of the system, but would impose the additional hazard of handling the aqueous ammonia.

Items such as tires, electrical system flight contrbl system, utility system, etc. are not adequately defined at this stage of the design to outline a complete cooling formulation although the following possibilities appear at this time to hold some promise:

Components associated with hydraulics and large bearings, such as servos, hydraulic actuators, and loaded mechanisms, may be cooled by oil as a carrier, making use of fuel as a heat sink to be shared with other oil systems such as engine oil, generator and constant-speed drive oil, etc. If the fuel cannot provide enough heat sink capacity for the various oil systems, an auxiliary water evaporative system may be provided to handle the excess heat.

Small parts such as electrical components other than the generator, flight control bearings and cranks, etc. may be cooled by a ram-air system with a water boiler heat exchanger for heat sink. All components to be cooled in this manner. however, will be limited to a few well-insulated compartments to prevent excessive penalty to the weapon System in terms of water weight.

The cooling of tires may be provided by a direct water spray, or ram-air system in which the air is cooled by direct evaporation.

(b) <u>Phase III</u>

The cooling system for Phase III is based on the latent and sensible heats of the liquid hydrogen engine fuel as a heat sink. Intermediate helium systems may be used to provide acceptable temperature levels at the heat sources, with heat exchangers to keep the fluids separated.

The fuel circuit is, in essence, a parallel system to the engine tail-pipe heat exchanger, and it is assumed here that provision will be available to tap the main fuel line between the final-stage pump and a fuel control so that a pressure margin will be available for circulation and control of the cooling circuits. If this margin is not available, then a boost pump will be provided as required.

The helium circuits are required in order to provide a cushion between the heat sources and the sink as direct contact with an X-35 fuel heat exchanger will freeze any of the carriers

normally used in aircraft fluid systems, including air. Also, the use of the fuel in heat-exchanger contact with other aircraft systems is considered dangerous from the standpoint of fire hazard. The helium systems will be closed-circuit sealed systems maintained at a pressure above the fuel circuit pressure by means of a helium storage bottle and pressure regulator.

The general breakdown shows three helium circuits. The oil cooling circuit provides a carrier for the heat from all the oil systems on the airplane. These systems may include engine oil, hydraulic oil, electrical generators, and constant-speed drives and/or auxiliary power units, or whatever source of power is made available to drive airframe accessories. Sources of heat within the systems will include heat of combustion, oil flow friction heat, and heat absorbed from the aerodynamically heated environment. A by-pass and a mixing valve are provided to maintain the helium-to-oil heat exchanger at a temperature above the congealing temperature of the oil.

One circuit provides a medium for cooling landing gear tires, small electrical components, and other items that cannot be cooled by other means. The air circuit associated with this system is an open circuit taking in ram air which is cooled in the helium-to-air heat exchanger, used as a coolant, and then dumped overboard.

The other circuit provides cooliing for electronic and camera equipment, cabin, and ventilated suit. Mixers and by-pass lines are provided in the circuits to the pilot's ventilated suit and to items of equipment requiring close temperature control, in order to maintain the temperature within the required range. With the exception of the pilot's ventilated suit, this is a closed pressurized system. Engine compressor air will be brought in to make up for leakage and the ventilated suit air. The ventilated suit air is dumped because the moistrue content would impose an unacceptable burden on the drying system employed to prevent frosting of the heat exchanger.

An emergency ram system is shown, with a provision for by-passing the heat exchanger during low-altitude operation where it is considered that frosting will make the heat exchanger unusable.

(2) Heating Systems

No special provisions will be made to heat the cabin. It is expected that ground operations will be supplemented by sufficient equipment to maintain the cabin at a comfortable level until take-off. At this point, the Phase II-1/2 system ventilated suit is provided with conditioned air which should be adequate for pilot comfort. On the Phase III system, it is considered that if heat is required in the short times after take-off and prior to landing, when aerodynamic heating is not significant, the cabin may be heated by a manually controlled bleed from the windshield anti-icing line.

(3) Anti-icing Systems

Anti-icing systems are provided for both the Phase II-1/2 and III systems. Due to the short time that the airplane will be exposed to icing conditions, deicing of the windshield and engine inlet duct lips only is considered to be the best design compromise.

The Phase II-1/2 system is a conventional system, making use of engine compressor bleed air as a source of heat and air out of the cooling system primary heat exchanger as a source of mixing air to keep the deicing air at a level compatible with the ability of the windshield to take the heat shock.

The design of an anti-icing system for Phase III is faced with two problems, one being the low compression ratio of the engine compressors, and the other being the fact that the product of combustion of the engine fuel is water. This requires that combustion gas not be mixed directly to provide the heat for deicing because of the possibility of build-up of ice downstream from the anti-iced area. Thus, air is bled from the engine compressor, through a heat exchanger, to a first-stage blower which increases the pressure to a level sufficient to anti-ice the engine scoop lips.

(4) Electrical System

The electrical system is planned to consist of a primary and an emergency ac power supply. Secondary dc power will be supplied to that equipment which, for various reasons, will require this type of input electrical energy.

The primary system will deliver 115-to 200-volt, 400-cycle, three-phase ac from automatically paralleled, engine-drive, constant-speed generators. The emergency system will deliver substantially the same type of power from a hydraulically driven, remotely mounted, controlled-speed generator.

The secondary 24- to 31-volt dc power will be obtained from static-type converters.

(5) Hydraulic System

The use of higher operating pressures in the weapon system to deliver maximum power at optimum weight involves the design and development of a 4000 psi, constant-pressure system capable of satisfactory operation in ambient environments up to 1200°F. The development of a 4000 psi system is now in progress at NAA and various suppliers for other aircraft projects.

(6) Structure

(a) Phase II-1/2

The Phase II-1/2 Airplane is a high-performance, low-load-factor, and low-wing-loaded airplane. These factors lead to a thin skin structure of materials which are capable of high-temperature applications.

The wings are designed around three main requirements: torsional stiffness for flutter control, bending stiffness parallel with the aileron axis for aileron effectiveness, and strength requirements. The wing contains an inboard constant-chord aileron extending from the fuselage to 50-percent wing span. Fuel is carried in integral tanks in the inboard portion of the wing. The wing, for the inboard 50-percent of the span, is three-spar multi-rib construction, welded for fuel seal. The outboard 50-percent of the span is full-depth brazed honeybomb construction. The structure type was determined by studying a number of structure systems and using the lightest type. The material used is AM350 corrosion-resistant steel.

The canard surface is mounted at the forward extremity of the fuselage and forms the nose section of the fuselage. The canard is hinged to the fuselage. The canard is hinged to the fuselage from approximately the 50-percent spar in the canard. The actuator is tied to the centerline rib of the surface. The canard is full-depth brazed honeycomb construction of AM350 corrosion-resistant steel.

The two verticals are constructed in a similar manner to the wings, and of the same material.

The fuselage is of semimonocoque construction. The frames and longerons are fabricated of steel, and the fuselage is covered with titanium alloy. The structure is riveted together, and the sealing in the integral tank area is accomplished by the insulation. The fuselage skin for a large portion of the fuselage is minimum gage that is feasible to fabricate. The wing is attached to the fuselage at three main bulkhead-type frames. The duct ramps and the flat-sided portions of the duct are fabricated of brazed-steel honeycomb paneling. The main gear is mounted in the fuselage and retracts inboard.

(b) Phase III

The Phase III Airplane is a high-performance, low-load-facter, and low-wing-loaded airplane. These factors lead to a thin skin structure of materials which are capable of high-temperature applications.

The delta wing arrangement provides an extremely long chord and short span. The wing is divided into three main structural sections. The first section, from the landing gear forward, is constructed as part of the fuselage. The fuselage frames are extended on out into the wing contour and form the wing structure. The main section of the wing is constructed of a three-spar, multirib arrangement. Aft of the spoiler slot, the wing is one-spar multirib construction. The wing contains no integral fuel. The wing material is AM350 corrosion-resistant steel. Due to the high temperatures from aerodynamic heating, the leading edge assembly is constructed of Inconel "X."

The canard surface is mounted at the forward extremity of the fuselage and forms the nose section of the fuselage. The canard is hinged to the fuselage from approximately the 50-percent spar in the canard. The actuator is tied to the centerline rib of the surface. The canard is full-depth honeycomb construction of AM350 corrosion-resistant steel, except for the leading edge which in Inconel "X."

The two verticals are constructed in a similar manner to the wings, for the lower portion of the span, and full-depth honeycomb, as in the canard, for the upper portion of the span.

The fuselage is of semimonocoque construction. The frames and longerons are fabricated of steel, and the fuselage is covered with titanium alloy. The fuel cells are separate internal tanks. This is necessary due to the large temperature gradiant from the fuselage skin at 750°F to the tank skin at -423°F (from the liquid hydrogen fuel). The internal tank is fabricated from 6061-T6 aluminum alloy welded construction and floats in the fuselage to allow for the temperature differences. The wing is attached to the fuselage at four main bulkhead-type frames. The duct ramps and the flat-sided portions of the duct are fabricated of brazed Inconel "X" honeycomb paneling.

The main landing gear is mounted to the front span of the main wing box and retracts forward into the wing.

GROUP WEIGHT STATEMENT

PHASE II-1/2

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GROUP WEIGHT STATEMENT
WEIGHT EMPTY

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1	WING GROUP					8927
2	CENTER SECTION - BASIC STRUCTURE					
3	INTERMEDIATE PANEL - BASIC STRUCTURE					
4	OUTER PANEL - BASIC STRUCTURE (INCL. TIPS LBS.)				7858	
5						
6	SECONDARY STRUCTURE (INCL. WINGFOLD MECHANISM LBS.)					
7	AILERONS (INCL. BALANCE WEIGHT LBS.)				1069	
8	FLAPS - TRAILING EDGE					
9	- LEADING EDGE					
10	SLATS					
11	SPOILERS					
12	SPEED BRAKES					
13						
14						
15	TAIL GROUP					1978
16	STABILIZER - BASIC STRUCTURE				753	
17	FINS - BASIC STRUCTURE (INCL. DORSAL LBS.)				1225	
18	SECONDARY STRUCTURE (STAB. & FINS)					
19	ELEVATOR (INCL. BALANCE WEIGHT LBS.)					
20	RUDDERS (INCL. BALANCE WEIGHT LBS.)					
21						
22						
23	BODY GROUP					20077
24	FUSELAGE OR HULL - BASIC STRUCTURE				17652	
25	BOOMS - BASIC STRUCTURE					
26	SECONDARY STRUCTURE - FUSELAGE OR HULL				950	
27	- BOOMS					
28	- SPEEDBRAKES					
29	- DOORS, PANELS & MISC.				1475	
30						
31	ALIGHTING GEAR GROUP - LAND (TYPE:)					6471
32–33	LOCATION	WHEELS, BRAKES TIRES, TUBES, AIR	STRUCTURE	CONTROLS		
34	Main - Fuselage	2563	2408	550	5521	
35	Nose - Fuselage	122	478	350	950	
36						
37						
38						
39						
40	ALIGHTING GEAR GROUP - WATER					
41	LOCATION	FLOATS	STRUTS	CONTROLS		
42						
43						
44						
45						
46	SURFACE CONTROLS GROUP					1412
47	COCKPIT CONTROLS				22	
48	AUTOMATIC PILOT					
49	SYSTEM CONTROLS (INCL. POWER & FEEL CONTROLS LBS.)				1390	
50						
51	ENGINE SECTION OR NACELLE GROUP					553
52	INBOARD					
53	CENTER				553	
54	OUTBOARD					
55	DOORS, PANELS & MISC.					
56						
57	TOTAL (TO BE BROUGHT FORWARD)					39418

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			AUXILIARY	MAIN		
1	PROPULSION GROUP					37217
2			AUXILIARY	MAIN		
3	ENGINE INSTALLATION				21940	
4	AFTERBURNERS (IF FURN. SEPARATELY)					
5	ACCESSORY GEAR BOXES & DRIVES				958	
6	SUPERCHARGERS (FOR TURBO TYPES)					
7	AIR INDUCTION SYSTEM				9273	
8	EXHAUST SYSTEM				327	
9	COOLING SYSTEM				28	
10	LUBRICATING SYSTEM					
11	TANKS					
12	COOLING INSTALLATION					
13	DUCTS, PLUMBING, ETC.					
14	FUEL SYSTEM				3929	
15	TANKS - PROTECTED					
16	- UNPROTECTED					
17	PLUMBING, ETC.			3929		
18	WATER INJECTION SYSTEM					
19	ENGINE CONTROLS				268	
20	STARTING SYSTEM				494	
21	PROPELLER INSTALLATION					
22						
23						
24	AUXILIARY POWER PLANT GROUP					
25	INSTRUMENTS & NAVIGATIONAL EQUIPMENT GROUP					489
26	HYDRAULIC & PNEUMATIC GROUP					1395
27						
28						
29	ELECTRICAL GROUP					682
30						
31						
32	ELECTRONICS GROUP					1438
33	EQUIPMENT				823	
34	INSTALLATION				615	
35						
36	ARMAMENT GROUP (INCL. GUNFIRE PROTECTION LBS.)					
37	FURNISHINGS & EQUIPMENT GROUP					1140
38	ACCOMMODATIONS FOR PERSONNEL				324	
39	MISCELLANEOUS EQUIPMENT				51	
40	FURNISHINGS				300	
41	EMERGENCY EQUIPMENT				465	
42						
43	AIR CONDITIONING & ANTI-ICING EQUIPMENT GROUP					1744
44	AIR CONDITIONING				1650	
45	ANTI-ICING				94	
46						
47	PHOTOGRAPHIC GROUP					
48	AUXILIARY GEAR GROUP					141
49	HANDLING GEAR				141	
50	ARRESTING GEAR					
51	CATAPULTING GEAR					
52	ATO GEAR					
53						
54						
55	MANUFACTURING VARIATION					
56	TOTAL FROM PG. 2					39418
57	WEIGHT EMPTY					93664

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GROUP WEIGHT STATEMENT
USEFUL LOAD & GROSS WEIGHT

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1	LOAD CONDITION DESIGN GROSS WEIGHT			DETAIL PHOTO MISSION			
2							
3	CREW (NO.)			270			
4	PASSENGERS (NO.)						
5	FUEL	Type	Gals.				
6	UNUSABLE	L. B. S. F.	53. 1	356			
7	INTERNAL	L. B. S. F.	17970	120399			
8							
9							
10	EXTERNAL						
11							
12	BOMB BAY						
13							
14	OIL						
15	TRAPPED	8 Gals.		60			
16	ENGINE	20 Gals.		150			
17							
18	FUEL TANKS (LOCATION)						
19	WATER INJECTION FLUID (GALS)						
20							
21	BAGGAGE						
22	CARGO						
23							
24	ARMAMENT						
25	GUNS (Location)	Fix. or Flex. / Qty.	Cal.				
26							
27							
28							
29							
30							
31							
32	AMMUNITION						
33							
34							
35							
36							
37							
38							
39	INSTALLATIONS (BOMB, TORPEDO, ROCKET, ETC.)						
*40	BOMB OR TORPEDO RACKS						
41							
42	RECONNAISSANCE PACKAGE			1958			
43							
44							
45							
46	EQUIPMENT						
47	PYROTECHNICS						
48	PHOTOGRAPHIC						
49							
*50	OXYGEN						
51							
52	MISCELLANEOUS						
53	WATER - EQUIPMENT COOLING			500			
54	LIQUID NITROGEN			443			
55	USEFUL LOAD			124136			
56	WEIGHT EMPTY			83664			
57	GROSS WEIGHT			207800			

*If not specified as weight empty.

Land Base Supersonic Fuel

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GROUP WEIGHT STATEMENT
USEFUL LOAD & GROSS WEIGHT

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					AN/APQ-56	AZIMUTH RADAR	SEARCH PHOTO MISSION	FERRET MISSION
1 2	LOAD CONDITION ALTERNATE							
3	CREW (NO.)				270	270	270	270
4	PASSENGERS (NO.)							
5	FUEL	Type	Gals.					
6	UNUSABLE	L. B. S. F.	53.1		356	356	356	356
7	INTERNAL	L. B. S. F.	17970		120399	120399	120399	120399
8								
9								
10	EXTERNAL							
11								
12	BOMB BAY							
13								
14	OIL							
15	TRAPPED	8 Gals.			60	60	60	60
16	ENGINE	20 Gals.			150	150	150	150
17								
18	FUEL TANKS (LOCATION)							
19	WATER INJECTION FLUID (GALS)							
20								
21	BAGGAGE							
22	CARGO							
23								
24	ARMAMENT							
25	GUNS (Location)	Fix. or Flex.	Qty.	Cal.				
26								
27								
28								
29								
30								
31								
32	AMMUNITION							
33								
34								
35								
36								
37								
38								
39	INSTALLATIONS (BOMB, TORPEDO, ROCKET, ETC.)							
*40	BOMB OR TORPEDO RACKS							
41								
42	RECONNAISSANCE PACKAGE				1952	1746	1638	1854
43								
44								
45								
46	EQUIPMENT							
47	PYROTECHNICS							
48	PHOTOGRAPHIC							
49								
*50	OXYGEN							
51								
52	MISCELLANEOUS							
53	WATER - EQUIPMENT COOLING				500	500	500	500
54	LIQUID NITROGEN				443	443	443	443
55	USEFUL LOAD				124130	123924	123816	124032
56	WEIGHT EMPTY				83664	83664	83664	83664
57	GROSS WEIGHT				207794	207588	207480	207696

*If not specified as weight empty.

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GROUP WEIGHT STATEMENT

PHASE III

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GROUP WEIGHT STATEMENT
WEIGHT EMPTY

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1	WING GROUP					24343
2	CENTER SECTION - BASIC STRUCTURE					
3	INTERMEDIATE PANEL - BASIC STRUCTURE					
4	OUTER PANEL - BASIC STRUCTURE [redacted]				21733	
5						
6	SECONDARY STRUCTURE (INCL. WINGFOLD MECHANISM LBS.)					
7	AILERONS (INCL. BALANCE WEIGHT LBS.)					
8	FLAPS - TRAILING EDGE					
9	- LEADING EDGE					
10	SLATS					
11	SPOILERS				1710	
12	SPEED BRAKES					
13	TIP-FOLDING WING				650	
14	TAB-TRIM (L. H. WING ONLY)				250	
15	TAIL GROUP					3040
16	STABILIZER - BASIC STRUCTURE (CANARD)				1400	
17	FINS - BASIC STRUCTURE (INCL. DORSAL LBS.) (2)				1640	
18	SECONDARY STRUCTURE (STAB. & FINS)					
19	ELEVATOR (INCL. BALANCE WEIGHT LBS.)					
20	RUDDERS (INCL. BALANCE WEIGHT LBS.)					
21						
22						
23	BODY GROUP					29876
24	FUSELAGE OR HULL - BASIC STRUCTURE					
25	BOOMS - BASIC STRUCTURE					
26	SECONDARY STRUCTURE - FUSELAGE OR HULL					
27	- BOOMS					
28	- SPEEDBRAKES					
29	- DOORS, PANELS & MISC.					
30						
31	ALIGHTING GEAR GROUP - LAND (TYPE: TRICYCLE)					11806
32–33	LOCATION	WHEELS, BRAKES TIRES, TUBES, AIR	STRUCTURE	CONTROLS		
34	Main- Wing	2147	8044	825	11016	
35	Nose - Fuselage	90	400	300	790	
36						
37						
38						
39						
40	ALIGHTING GEAR GROUP - WATER					
41	LOCATION	FLOATS	STRUTS	CONTROLS		
42						
43						
44						
45						
46	SURFACE CONTROLS GROUP					4996
47	COCKPIT CONTROLS				22	
48	AUTOMATIC PILOT					
49	SYSTEM CONTROLS (INCL. POWER & FEEL CONTROLS 1373 LBS.)				4974	
50						
51	ENGINE SECTION [redacted]					306
52	INBOARD					
53	CENTER				306	
54	OUTBOARD					
55	DOORS, PANELS & MISC.					
56						
57	TOTAL (TO BE BROUGHT FORWARD)					74367

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		Auxiliary		Main		
1	PROPULSION GROUP					56025
2		AUXILIARY		MAIN		
3	ENGINE INSTALLATION				15660	
4	AFTERBURNERS (IF FURN. SEPARATELY)					
5	ACCESSORY GEAR BOXES & DRIVES				1010	
6	SUPERCHARGERS (FOR TURBO TYPES)					
7	AIR INDUCTION SYSTEM				25680	
8	EXHAUST SYSTEM - SHROUD				340	
9	COOLING SYSTEM & DRAIN PROV.				280	
10	LUBRICATING SYSTEM (INTEGRAL IN ENGINE)				-	
11	TANKS					
12	COOLING INSTALLATION					
13	DUCTS, PLUMBING, ETC.					
14	FUEL SYSTEM				12755	
15	TANKS - PROTECTED					
16	- UNPROTECTED			6860		
17	PLUMBING, ETC.			5895		
18	WATER INJECTION SYSTEM					
19	ENGINE CONTROLS				300	
20	STARTING SYSTEM (INTEGRAL IN ENGINE)				-	
21	PROPELLER INSTALLATION					
22						
23						
24	AUXILIARY POWER PLANT GROUP					
25	INSTRUMENTS [redacted] GROUP					564
26	HYDRAULIC & PNEUMATIC GROUP					5090
27						
28						
29	ELECTRICAL GROUP					815
30						
31						
32	ELECTRONICS GROUP					1438
33	EQUIPMENT				823	
34	INSTALLATION				615	
35						
36	ARMAMENT GROUP (INCL. GUNFIRE PROTECTION LBS.)					
37	FURNISHINGS & EQUIPMENT GROUP					1241
38	ACCOMMODATIONS FOR PERSONNEL				324	
39	MISCELLANEOUS EQUIPMENT				52	
40	FURNISHINGS				400	
41	EMERGENCY EQUIPMENT				465	
42						
43	AIR CONDITIONING & ANTI-ICING EQUIPMENT GROUP					3092
44	AIR CONDITIONING				2880	
45	ANTI-ICING				212	
46						
47	PHOTOGRAPHIC GROUP					
48	AUXILIARY GEAR GROUP					210
49	HANDLING GEAR				210	
50	ARRESTING GEAR					
51	CATAPULTING GEAR					
52	ATO GEAR					
53						
54						
55	MANUFACTURING VARIATION					
56	TOTAL FROM PG. 2					74367
57	WEIGHT EMPTY					142842

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GROUP WEIGHT STATEMENT
USEFUL LOAD & GROSS WEIGHT

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1	LOAD CONDITION	DESIGN GROSS WEIGHT			DESIGN PHOTO MISSION			
2								
3	CREW (NO.)				270			
4	PASSENGERS (NO.)							
5	FUEL	Type	Gals.					
6	UNUSABLE	LIQUID H_2	320		187			
7	INTERNAL	LIQUID H_2	101330		59278			
8								
9								
10	EXTERNAL							
11								
12	BOMB BAY							
13								
14	OIL							
15	TRAPPED	8 Gals.			60			
16	ENGINE	12 Gals.			90			
17								
18	FUEL TANKS (LOCATION)							
19	WATER INJECTION FLUID (GALS)							
20								
21	BAGGAGE							
22	CARGO							
23								
24	ARMAMENT							
25	GUNS (Location)	Fix. or Flex.	Qty.	Cal.				
26								
27								
28								
29								
30								
31								
32	AMMUNITION							
33								
34								
35								
36								
37								
38								
39	INSTALLATIONS (BOMB, TORPEDO, ROCKET, ETC.)							
*40	BOMB OR TORPEDO RACKS							
41								
42								
43								
44								
45								
46	EQUIPMENT							
47	PYROTECHNICS							
48	PHOTOGRAPHIC							
49	RECONN. PACKAGE, DES. PHOTO MIS.				1958			
*50	OXYGEN							
51								
52	MISCELLANEOUS							
53	DROP-OFF COWL				2115			
54								
55	USEFUL LOAD				63958			
56	WEIGHT EMPTY				142842			
57	GROSS WEIGHT				206800			

*If not specified as weight empty.

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GROUP WEIGHT STATEMENT
USEFUL LOAD & GROSS WEIGHT

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No.	Item				RADAR MAPPING MIS. DOPPLER RADAR	RADAR MAPPING MIS. AZIMUTH RADAR	SEARCH PHOTO MISSION	FERRET MISSION
1, 2	LOAD CONDITION ALTERNATE							
3	CREW (NO.)				270	270	270	270
4	PASSENGERS (NO.)							
5	FUEL	Type	Gals.					
6	UNUSABLE	LIQUID H_2	320		187	187	187	187
7	INTERNAL	LIQUID H_2	101330		59278	59278	59278	59278
8								
9								
10	EXTERNAL							
11								
12	BOMB BAY							
13								
14	OIL							
15	TRAPPED	8 Gals.			60	60	60	60
16	ENGINE	20 Gals.			90	90	90	90
17								
18	FUEL TANKS (LOCATION)							
19	WATER INJECTION FLUID (GALS)							
20								
21	BAGGAGE							
22	CARGO							
23								
24	ARMAMENT							
25	GUNS (Location)	Fix. or Flex.	Qty.	Cal.				
26								
27								
28								
29								
30								
31								
32	AMMUNITION							
33								
34								
35								
36								
37								
38								
39	INSTALLATIONS (BOMB, TORPEDO, ROCKET, ETC.)							
*40	BOMB OR TORPEDO RACKS							
41								
42	RECONNAISSANCE PACKAGE				1952	1746	1638	1854
43								
44								
45								
46	EQUIPMENT							
47	PYROTECHNICS							
48	PHOTOGRAPHIC							
49								
*50	OXYGEN							
51								
52	MISCELLANEOUS							
53	DROP-OFF COWL				2115	2115	2115	2115
54								
55	USEFUL LOAD				63952	63746	63638	63854
56	WEIGHT EMPTY				142842	142842	142842	142842
57	GROSS WEIGHT				206794	206588	206480	206696

*If not specified as weight empty.

b. PERFORMANCE

PHASE II-1/2

POWER PLANT

No. & Model .(4) X275A 135% Size
Mfr . . . . General Electric
Engine Spec No. . . . .
R56AGT 120, R56AGT 16
Type. . . . . Axial
Length. . . . . 210.8"
Diameter. . . . . 48.8"
Weight (dry). . . . . . . 5480 lb
Tail Pipe . . . Mech, Dual Area
Augmentation. . . . Afterburner

ENGINE RATINGS

S.L. Static	Lb	RPM
Max reheat:	*28,540	7283
Partial reheat:	*24,826	7283
Mil:	**21,128	7283
Nor:	19,710	7195

*With afterburner operating
** Maximum non-reheat

DIMENSIONS

Wing
Span . . . . 64.9'
Incidence (root) . . . . . 0°
(tip) . . . . . 0°
Dihedral . . . . -5°
Sweepback (25% chord). . 52.4°
Length . . . . .120.9'
Height . . . . 23.5'
Tread . . . . 17.3'

Mission and Description

Navy Designation: None Mfr's Model: None

The primary mission of this aircraft is the high altitude reconnaissance of hostile ground installations.

Special features of this airplane are a mechanically controlled convergent-divergent nozzle. interchangeable reconnaissance equipment packages, a canard configuration, and airframe construction of steel and titanium.

The crew of one consists of the pilot.

The pilot is provided with automatic flight control and navigation systems.

Development

Design initiated. . . . . .Oct 55

BOMBS

GUNS

ROCKETS

NOT APPLICABLE

PACKAGES

No.	Type	
1	Search Photo System	
1	Detail Photo System	
1	Mapping Radar	APQ-56
1	Ferret System	
1	Azimuth Radar	

WEIGHTS

Loading	Lb	L.F.
Empty	83,664 (E)	
Basic	86,038 (F)	
Design	207,800	1.6
Combat	*133,733	1.6
Max T.O.	+207,800	1.6
Max in Flt	++207,800	1.6
Max Land.	+207,800	1.6

(E) Estimated
* For Design Mission
\+ Limited by Mission
++ By Refueling

FUEL

Location	No. Tanks	Gal
Fuselage	8	14,870
Wing	2	3,100
	Total	17,970

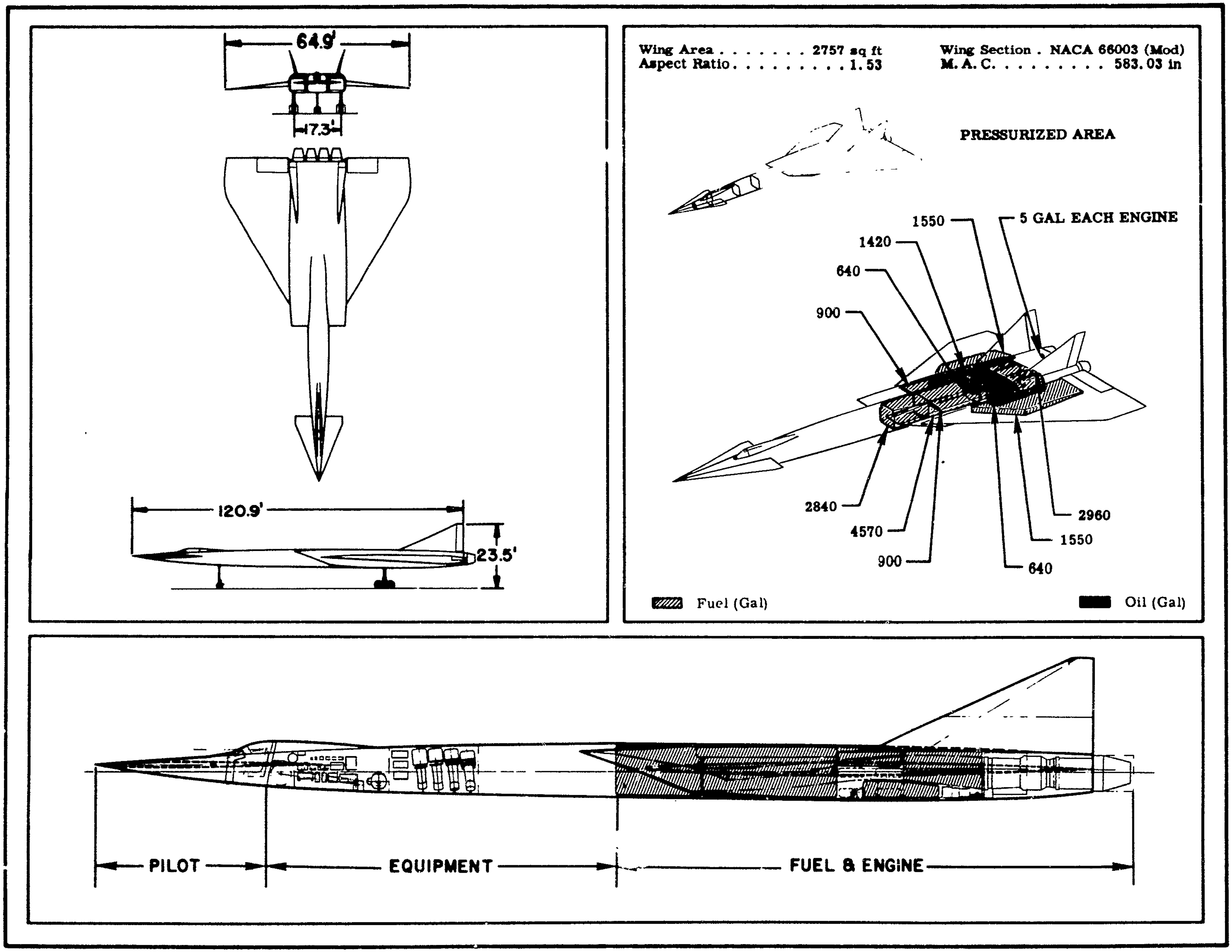
Grade . . . . Land based . .supersonic fuel
Specification . . . Unclassified

OIL

Fuselage . . . 4 20
Specification. . . Unclassified

ELECTRONICS

UHF Command ARC-52
UHF D/F ARA-37 (XN-1)
Recorder AMH-5
A/G IFF (XP) APX-19
A/A IFF (XP) APX-27
Crash Locator Beacon . . ART-27
Autonavigator. N5C
Standby Platform . . . . . .
Auto Flt Control System. .


64.9'
17.3'
120.9'
23.5'
Wing Area . . . . 2757 sq ft
Aspect Ratio 1.53
Wing Section . NACA 66003 (Mod)
M. A. C. . . . . 583.03 in
PRESSURIZED AREA
1550
5 GAL EACH ENGINE
1420
640
900
2840
4570
900
2960
1550
640
Fuel (Gal)
Oil (Gal)
PILOT
EQUIPMENT
FUEL & ENGINE

NA-56-454

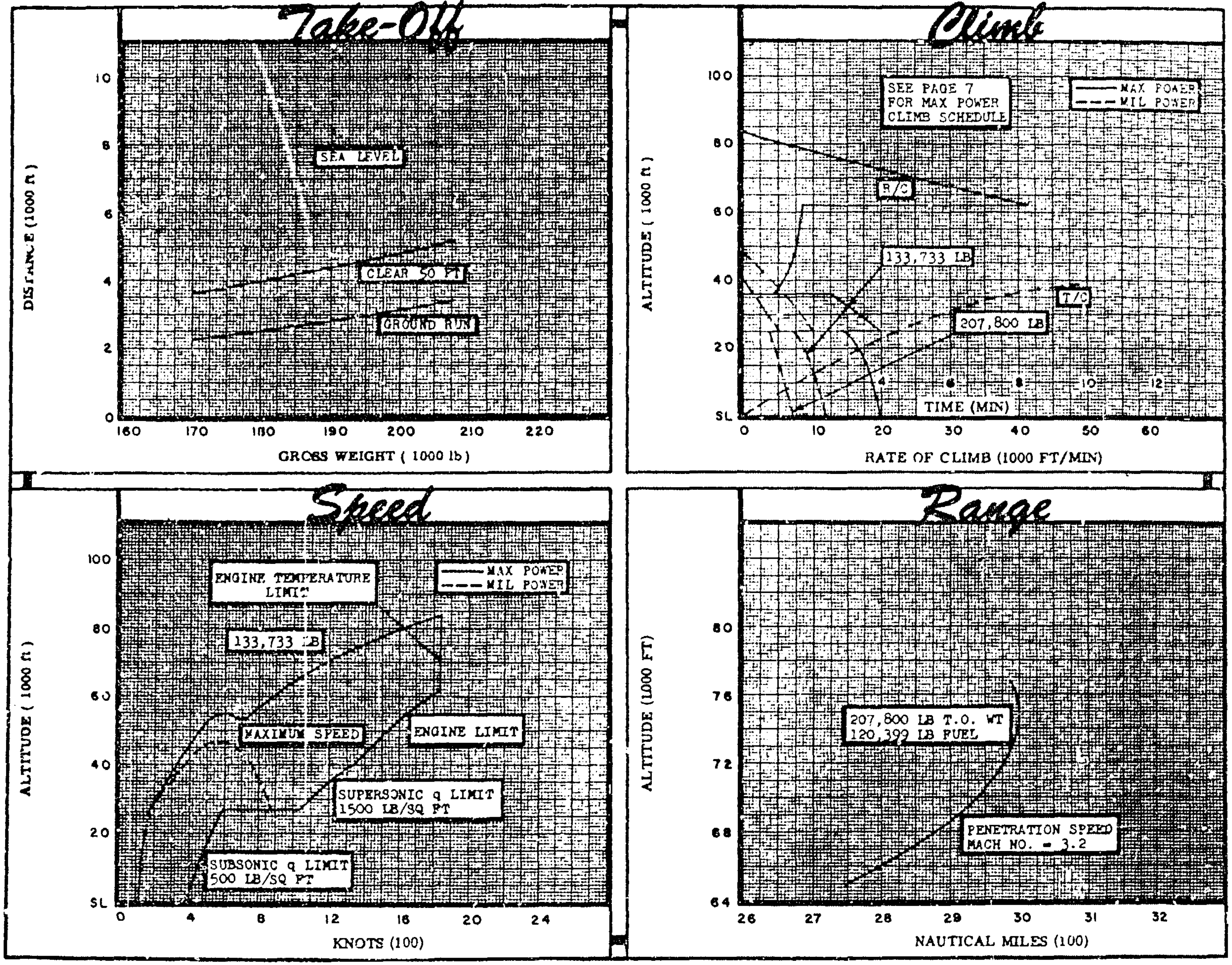
Loading and Performance—Typical Mission

CONDITIONS			DESIGN MISSION I	DESIGN FERRY MISSION II
TAKE-OFF WEIGHT		(lb)	207,800	207,800
Fuel at 6.7 lb/gal (grade unclassified)		(lb)	120,399	120,399
Payload (ammunition)		(lb)	none	none
Payload (bombs)		(lb)	none	none
Wing loading		(psf)	75.4	75.4
Stall speed (power off)	6	(kn)	178.5	178.5
Take-off ground run at SL	1	(ft)	3400	3400
Take-off to clear 50 ft	1	(ft)	5150	5150
Rate of climb at SL	2	(fpm)	6850	6850
Time: SL to 20,000 ft	2 3	(min)	3.4	3.4
Time: SL to 30,000 ft	2 3	(min)	5.7	5.7
Service ceiling (100 fpm)	2	(ft)	40,000	40,000
COMBAT RANGE	4	(n mi)	3032	3032
COMBAT RADIUS	4	(n mi)	—	—
Average speed		(kn)	1835	1835
Initial cruising altitude		(ft)	75,000	75,000
Total mission time		(hr)	2.07	2.07
MISSION WEIGHT	5	(lb)	133,733	99,441
Mission altitude	1	(ft)	75,000	79,000
Mission speed	1	(kn)	1835	1835
Mission climb	1	(fpm)	15,000	18,000
Mission ceiling (500 fpm)	1	(ft)	83,000	88,150
Service ceiling (100 fpm)	2	(ft)	47,900	52,500
Max rate of climb at SL	1	(fpm)	19,700	21,800
Basic speed at 35,000 ft	1	(kn)	1200	1200
Max speed at optimum altitude		(kn/ft)	1835/83,500	1835/83,500
LANDING WEIGHT		(lb)	99,441	99,441
Ground roll at SL		(ft)	4630	4630
Total from 50 ft		(ft)	6690	6690

NOTES

1. Maximum power
2. Military (max non-reheat) power
3. Allows for weight reduction during ground operation and climb
4. Detailed descriptions of RANGE missions given on page 6
5. Mission weight denotes combat weight and is arbitrarily the weight at a point 1500 n.mi. from base.
6. See note "b" page 6

PERFORMANCE BASIS:
(a) Data source: Estimated.
(b) Performance is based on powers shown on page 6.
(c) Fuel flow data used in computing RADIUS and RANGE are increased 5%.


Take-Off
DISTANCE (1000 ft)
0
2
4
6
8
10
160
170
180
190
200
210
220
GROSS WEIGHT (1000 lb)
SEA LEVEL
CLEAR 50 FT
GROUND RUN
Climb
ALTITUDE (1000 ft)
SL
20
40
60
80
100
0
10
20
30
40
50
60
RATE OF CLIMB (1000 FT/MIN)
TIME (MIN)
4
6
8
10
12
SEE PAGE 7
FOR MAX POWER
CLIMB SCHEDULE
MAX POWER
MIL POWER
R/C
133,733 LB
207,800 LB
T/C
Speed
ALTITUDE (1000 ft)
SL
20
40
60
80
100
0
4
8
12
16
20
24
KNOTS (100)
ENGINE TEMPERATURE
LIMIT
MAX POWER
MIL POWER
133,733 LB
MAXIMUM SPEED
ENGINE LIMIT
SUPERSONIC q LIMIT
1500 LB/SQ FT
SUBSONIC q LIMIT
500 LB/SQ FT
Range
ALTITUDE (1000 FT)
64
68
72
76
80
26
27
28
29
30
31
32
NAUTICAL MILES (100)
207,800 LB T.O. WT
120,399 LB FUEL
PENETRATION SPEED
MACH NO. = 3.2

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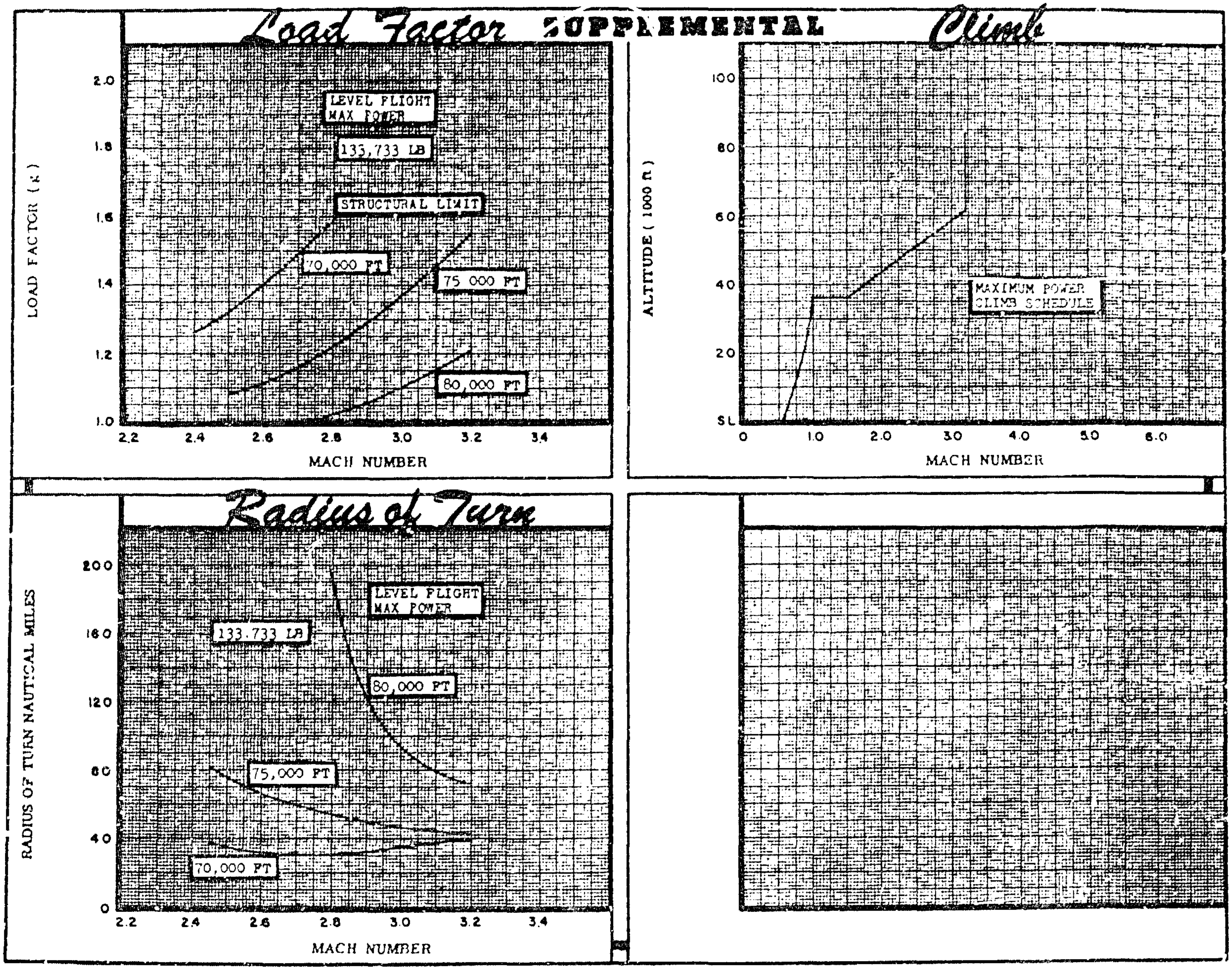

SUPPLEMENTAL
Load Factor
LEVEL FLIGHT
MAX POWER
133,733 LB
STRUCTURAL LIMIT
70,000 FT
75 000 FT
80,000 FT
LOAD FACTOR (N)
2.0
1.8
1.6
1.4
1.2
1.0
2.2
2.4
2.6
2.8
3.0
3.2
3.4
MACH NUMBER
Climb
MAXIMUM POWER
CLIMB SCHEDULE
ALTITUDE (1000 ft)
100
80
60
40
20
SL
0
1.0
2.0
3.0
4.0
5.0
6.0
MACH NUMBER
Radius of Turn
LEVEL FLIGHT
MAX POWER
133.733 LB
80,000 FT
75,000 FT
70,000 FT
RADIUS OF TURN NAUTICAL MILES
200
160
120
80
40
0
2.2
2.4
2.6
2.8
3.0
3.2
3.4
MACH NUMBER

NA-56-454

N O T E S

FORMULA: RANGE MISSION I

Take-off and accelerate to climb speed with maximum power, climb on course to the isothermal level with military(maximum non-reheat) power, accelerate and climb to cruise altitude with maximum power, cruise out at penetration speed, cruise to maximum penetration, complete mission, cruise to base at penetration speed. Range free allowances include 5 minutes of normal power at sea level for starting engines and take-off and a reserve of 10% of initial fuel.

FORMULA: RANGE MISSION II

Take-off and accelerate to best climb speed with maximum power, climb on course to the isothermal level with military(maximum non-reheat) power, accelerate and climb to best cruise altitude with maximum power, cruise out at long range speed. Range free allowances include 5 minutes of normal power at sea level for starting engines and take-off and a reserve of 10% of initial fuel.

GENERAL DATA

(a) Engine ratings shown on page 3 are guaranteed values. Installed values used in performance calculations are as follows:

(4) X275A 135% Size		
S.L. STATIC	LB	RPM
Max:	*22,500	7283
Mil:	**17,000	7283
Nor:	15,800	7195

* With afterburner operating
** Maximum non-reheat

(b) Stall speed limited by 13° tail down ground angle in presence of ground.

PERFORMANCE BASIS:

Performance data are based on North American Report No. NA-56-566, dated 31 May 1956, "Aerodynamic Characteristics System 118P - Phase II 1/2".

REVISION BASIS:

Initial issue.

b. PERFORMANCE

PHASE III

POWER PLANT

No. & Model . . . . . .
(4) ATR-2040, 103.1% Size
Mfr . . . . Aero Jet General
Engine Spec No. . . . . No. 1090
Type . . . . Axial
Length . . . . 197"
Diameter . . . . 68"
Weight (dry). . . . . . 3940 lb
Tail Pipe . . . Mech, Dual Area
Augmentation. . . . . None

ENGINE RATINGS

S.L. Static	Lb	-	Min
Max:	27,425	-	Limited
Max cont:	17,320	-	Cont

DIMENSIONS

Wing
Span . . . . 79.9'
Folding Tips Down . . . 65.9'
Incidence (root) . . . . . 0°
(tip) . . . . . 0°
Dihedral . . . . -10°
Sweepback (25% chord). . 71.6°
Length . . . . 180.9'
Height . . . . 33.3'
Tread . . . . 27.5'

Mission and Description

Navy Designation: None   Mfr's Model: None

The primary mission of this aircraft is the high altitude reconnaissance of hostile ground installations.

Special features of this airplane are hydrogen fueled air turbo rocket engines, interchangeable reconnaissance equipment packages, a canard configuration, folding wing tips for supersonic flight, a blow-off cowl and airframe construction of steel and titanium.

The crew of one consists of the pilot.

The pilot is provided with automatic flight control and navigation systems.

Development

Design initiated. . . . . .Oct 55

BOMBS

GUNS

ROCKETS

NOT APPLICABLE

PACKAGES

No.	Type
1	Search Photo System .
1	Detail Photo System .
1	Mapping Radar APQ-56
1	Ferret System . . . .
1	Azimuth Radar . . . .

WEIGHTS

Loading	Lb	L.F.
Empty . . .	142,842 (E)	
Basic . . .	147,162 (E)	
Design . .	206,800	1.6
Combat . .	*164,585	1.6
Max T.O.	+206,800	1.6
Max in Flt	+206,800	1.6
Max Landing	+206,800	1.6

(E) Estimated
* For Design Mission
\+ Limited by Mission

FUEL

Location	No. Tanks	Gal
Fuselage. . . .	7 . . .	101,330
	Total	101,330

Grade . . . Liquid Para Hydrogen
Specification . . . Unclassified

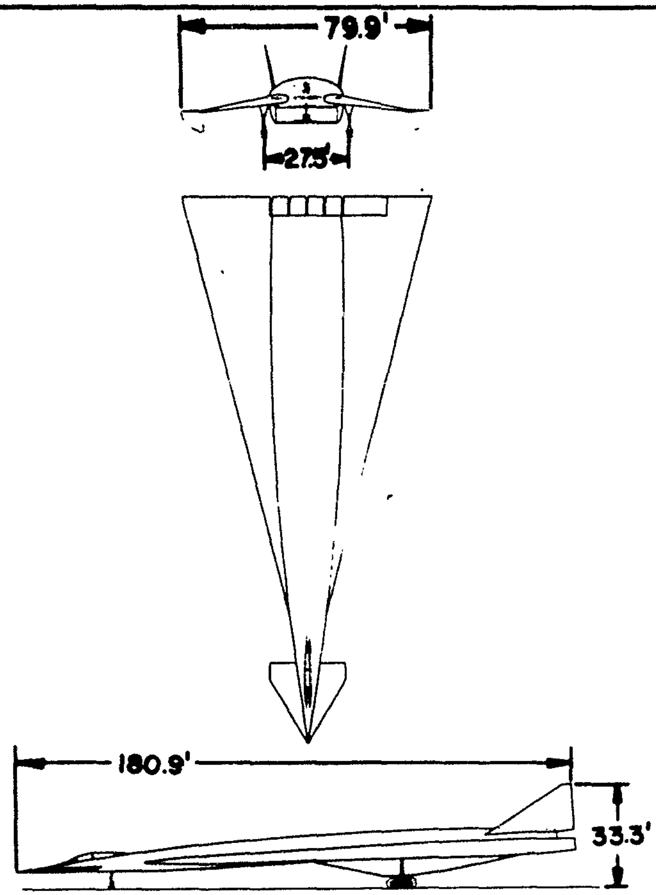
OIL

Fuselage. . . . 4 12
Specification . . . Unclassified

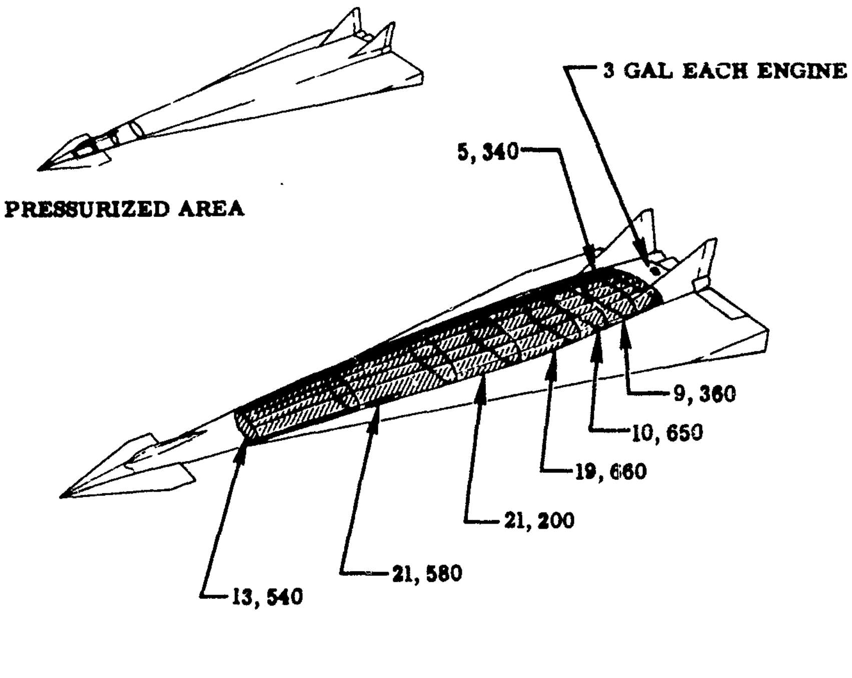
ELECTRONICS

UHF Command ARC-52
UHF D/F ARA-37 (XN-1)
Recorder ANH-5
A/G IFF (XP). APX-19
A/A IFF (XP). APX-27
Crash Locator Beacon. . . ART-27
Autonavigator N5C
Standby Platform. . . . . .
Auto Flt Control System . .

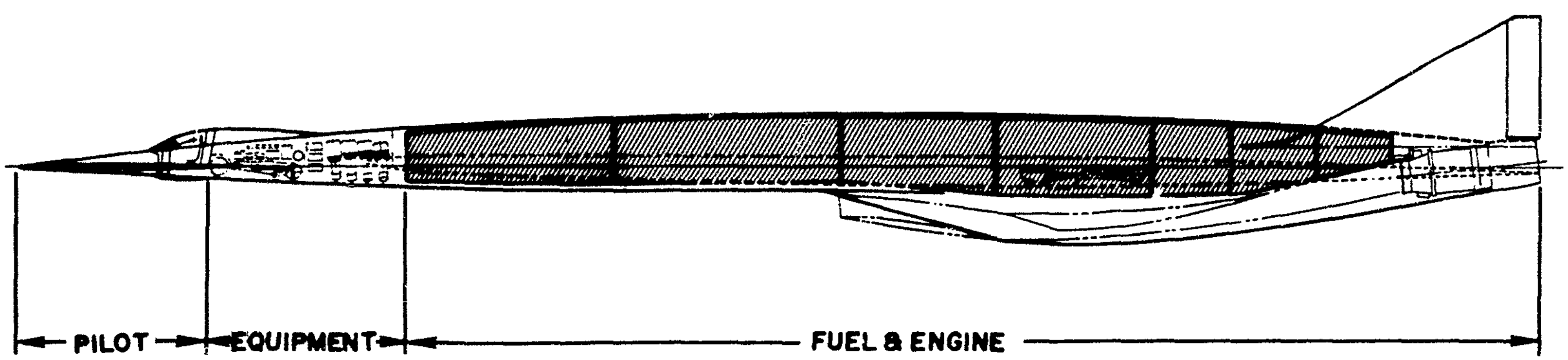
NA-56-454



Wing Area	
Folding Tips Up . . . . . . 6600 sq ft	Wing Section . NACA 66003 (Mod)
Folding Tips Down . . . . 6396 sq ft	M. A. C. . . . . 1301.60 in.
	Aspect Ratio 967



Fuel (Gal) ☆ Water Alcohol (Gal) Oil (Gal)



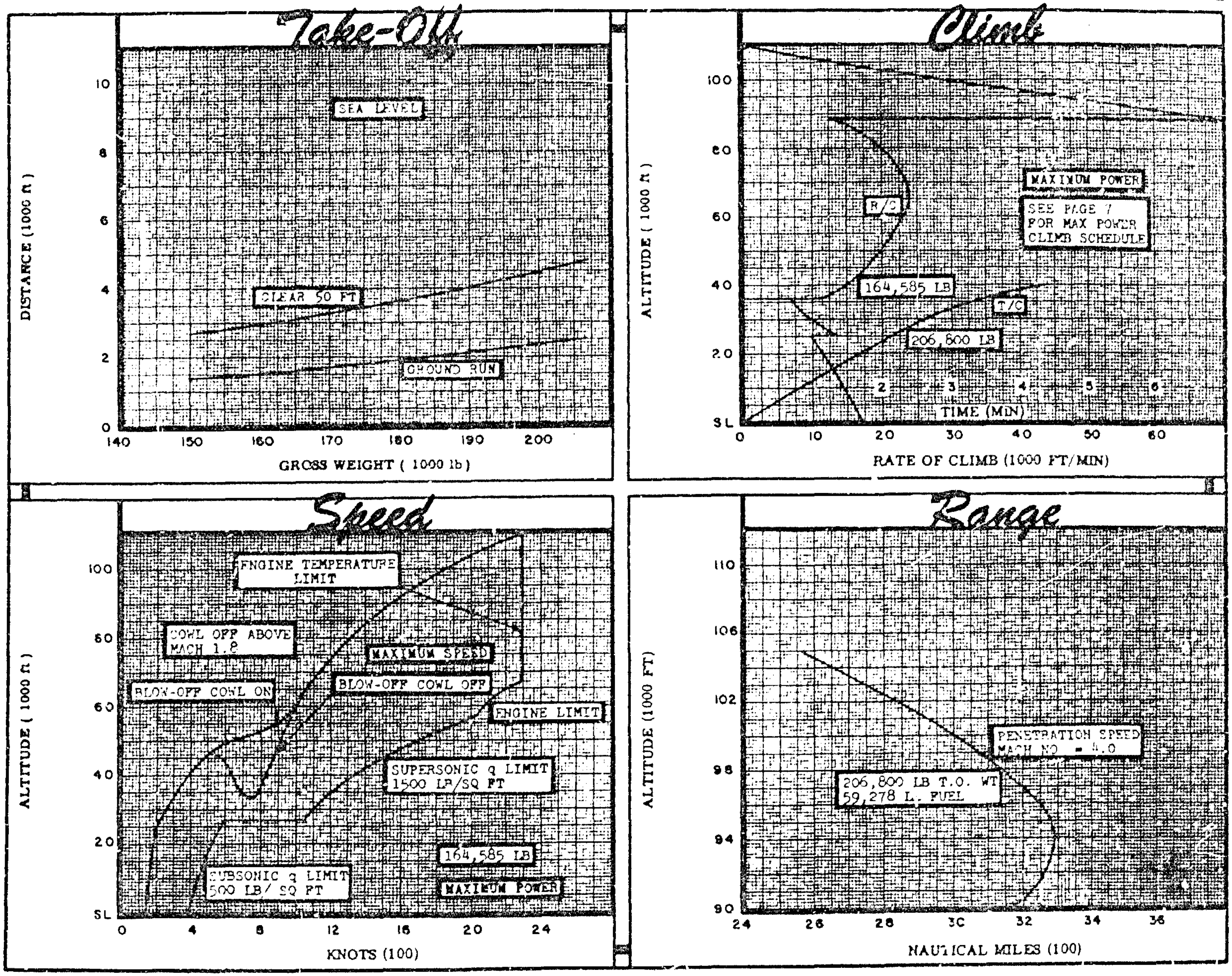
Loading and Performance — Typical Mission

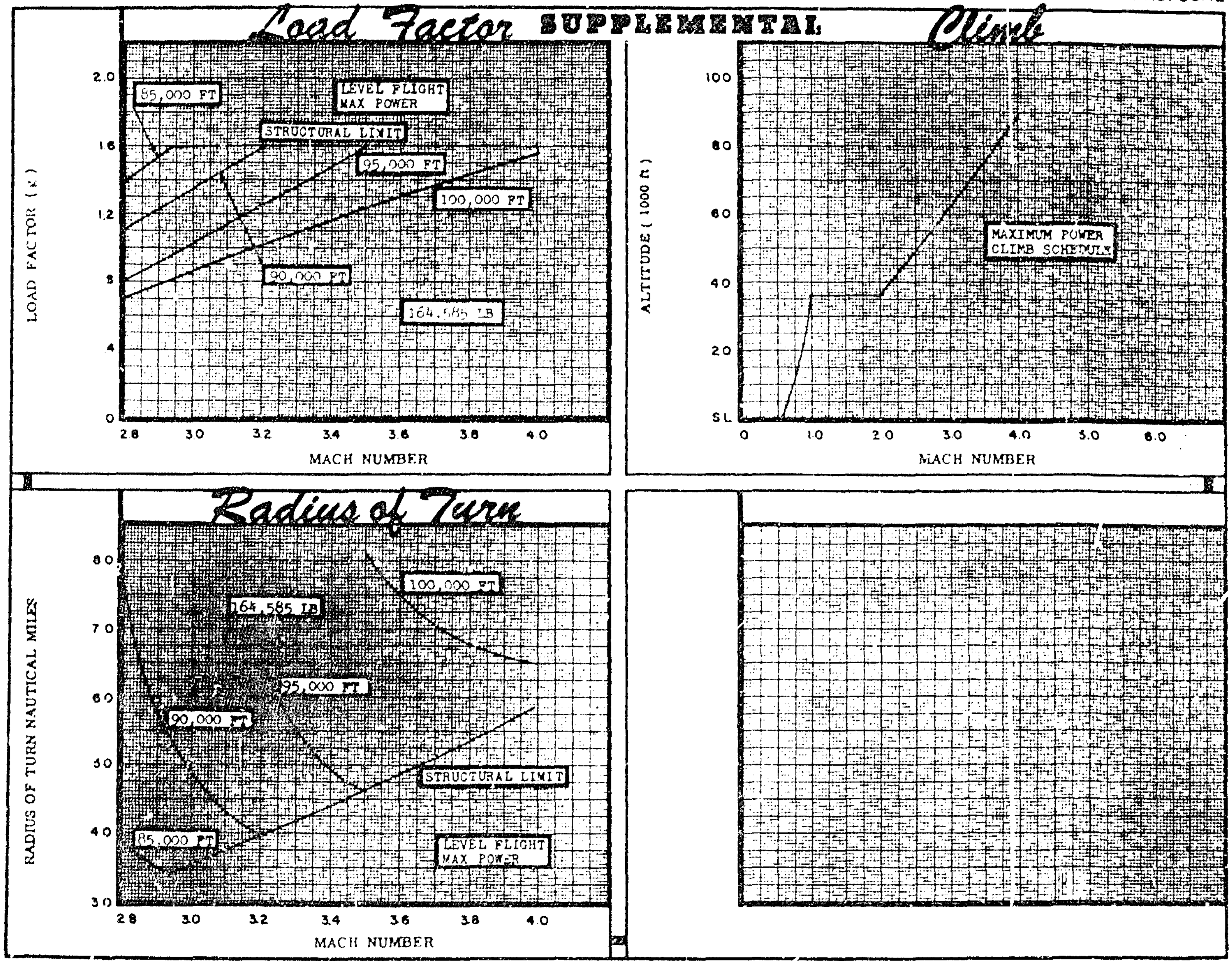
CONDITIONS			DESIGN MISSION I	DESIGN FERRY MISSION II
TAKE-OFF WEIGHT		(lb)	206,800	206,800
Fuel at .585 lb/gal (grade unclassified)		(lb)	59,278	59,278
Payload (ammunition)		(lb)	none	none
Payload (bombs)		(lb)	none	none
Wing loading	6	(psf)	31.3	31.3
Stall speed (power off)	5 6	(kn)	141.3	141.3
Take-off ground run at SL	1 6	(ft)	2515	2515
Take-off to clear 50 ft	1 6	(ft)	4800	4800
Rate of climb at SL	1	(fpm)	14,100	14,100
Time: SL to 20,000 ft	1 3	(min)	1.7	1.7
Time: SL to 30,000 ft	1 3	(min)	2.6	2.6
Service ceiling (100 fpm)	1	(ft)	99,500	99,500
COMBAT RANGE	4	(n mi)	3000	3290
COMBAT RADIUS		(n mi)	———	———
Average speed		(kn)	2294	2294
Initial cruising altitude		(ft)	100,000	94,000
Total mission time		(hr)	1.66	1.66
MISSION WEIGHT	2	(lb)	164,585	151,335
Mission altitude	1	(ft)	100,000	94,000
Mission speed	1	(kn)	2294	2294
Mission climb	1	(fpm)	28,500	58,100
Mission ceiling (500 fpm)	1	(ft)	109,800	111,300
Service ceiling (100 fpm)	1	(ft)	109,900	111,500
Max rate of climb at SL	1	(fpm)	17,000	20,100
Basic speed at 35,000 ft	1	(kn)	1200	1200
Max speed at optimum altitude	1	(kn/ft)	2294/110,000	2294/94,000
LANDING WEIGHT		(lb)	151,335	151,335
Ground roll at SL	6	(ft)	4730	4730
Total from 50 ft	6	(ft)	7250	7250

NOTES

1. Maximum power
2. Mission weight denotes combat weight and is arbitrarily the weight at a point 1500 n mi from base.
3. Allows for weight reduction during ground operation and climb
4. Detailed descriptions of Range missions given on page 6
5. See note "b" page 6
6. See note "c" page 6

PERFORMANCE BASIS:
(a) Data source: Estimated.
(b) Performance is based on powers shown on page 6.
(c) Fuel flow data used in computing RADIUS and RANGE are increased 5%.


Take-Off
SEA LEVEL
CLEAR 50 FT
GROUND RUN
DISTANCE (1000 ft)
GROSS WEIGHT (1000 lb)
Climb
MAXIMUM POWER
SEE PAGE 7
FOR MAX POWER
CLIMB SCHEDULE
R/C
164,585 LB
T/C
206,800 LB
TIME (MIN)
ALTITUDE (1000 ft)
RATE OF CLIMB (1000 FT/MIN)
Speed
ENGINE TEMPERATURE LIMIT
COWL OFF ABOVE MACH 1.8
MAXIMUM SPEED
BLOW-OFF COWL ON
BLOW-OFF COWL OFF
ENGINE LIMIT
SUPERSONIC q LIMIT 1500 LB/SQ FT
164,585 LB
SUBSONIC q LIMIT 500 LB/ SQ FT
MAXIMUM POWER
ALTITUDE (1000 ft)
KNOTS (100)
Range
PENETRATION SPEED MACH NO = 4.0
206,800 LB T.O. WT
59,278 L. FUEL
ALTITUDE (1000 FT)
NAUTICAL MILES (100)


Load Factor
SUPPLEMENTAL
Climb
LOAD FACTOR
2.0
1.6
1.2
.8
.4
0
2.8
3.0
3.2
3.4
3.6
3.8
4.0
MACH NUMBER
85,000 FT
LEVEL FLIGHT
MAX POWER
STRUCTURAL LIMIT
95,000 FT
100,000 FT
90,000 FT
164,585 LB
ALTITUDE (1000 ft)
100
80
60
40
20
SL
0
1.0
2.0
3.0
4.0
5.0
6.0
MACH NUMBER
MAXIMUM POWER
CLIMB SCHEDULE
Radius of Turn
RADIUS OF TURN NAUTICAL MILES
80
70
60
50
40
30
2.8
3.0
3.2
3.4
3.6
3.8
4.0
MACH NUMBER
100,000 FT
164,585 LB
95,000 FT
90,000 FT
STRUCTURAL LIMIT
85,000 FT
LEVEL FLIGHT
MAX POWER

N O T E S

FORMULA: RANGE MISSION I

Take-off and accelerate to climb speed with maximum power, climb on course to 36,089 feet with maximum power, accelerate and climb to cruise altitude with maximum power, cruise out at penetration speed, cruise to maximum penetration, complete mission, cruise to base at penetration speed. Range free allowances include 5 minutes of maximum continous power at sea level for starting engines and take-off and a reserve of 10% of initial fuel.

FORMULA: RANGE MISSION II

Take-off and accelerate to climb speed with maximum power, climb on course to 36,089 feet with maximum power, accelerate and climb to cruise altitude with maximum power. cruise out at long range speeds. Range free allowances include 5 minutes of maximum continous power at sea level for starting engines and take-off and a reserve of 10% of initial fuel.

GENERAL DATA:

(a) Engine ratings shown on page 3 are guaranteed values. Installed values used in performance calculations are as follows:

(4) ATR-2040 103.1% Size	
S.L. STATIC	LB
Maximum:	*14,700
Maximum Continuous:	**14,450

* With blow-off cowl installed
** With blow-off cowl off

(b) Stall speed limited by 10° tail down ground angle in presence of ground.

(c) Denotes folding tips up; all other performance is based on folding tips down.

PERFORMANCE BASIS:

Performance data are based on North American Report No. NA-56-613, dated 31 May 1956, "Aerodynamic Characteristics System 118P - Phase III".

REVISION BASIS:

Initial issue.

c. Flight Controls

The flight control system proposed for Weapon System 118P is an integrated system composed of mechanical, hydraulic, electromechanical, and electronic components. The aerodynamic flight control surfaces are positioned by irreversible dual hydraulic actuators and dual mechanical control valves. Pilot inputs to the valves are accomplished through a single mechanical linkage system from the pilot's controls to the actuator valves. Automatic flight control (AFCS) inputs to the valves are accomplished through series and parallel hydraulic actuators with electromechanical control valves and associated electronic components. Three basic modes of operation are provided: the primary manual control mode, the automatic control mode, and the alternate manual control mode.

(1) Primary Control Mode

The primary manual control mode provides for pilot control of the airplane flight path through the cockpit control stick and pedals. The AFCS is utilized in this mode to add or subtract from the pilot inputs to the control surfaces so as to provide optimum static, accelerated, and dynamic handling qualities over the airplane flight range. "Fail-safety" is accomplished in this mode through the use of redundancy with automatic shutoff centering and locking. When this cycle of operation occurs, the alternate control mode is automatically in use.

(2) Automatic Control Mode

Automatic control of the airplane is accomplished through the AFCS providing the following functions:

Pilot Relief
Mach hold
Altitude hold
Heading hold
Attitude hold
Tie-in to Electronic Subsystem
Automatic navigation

"Fail-safety" in the automatic mode is accomplished by the use of command limiters in addition to the provisions of the primary control mode.

(3) Alternate Control Mode

An alternate manual control mode is provided for pilot control of the airplane through the mechanical and hydraulic system components only. This mode is available for use only if the AFCS is inoperative. Based on mission capability considerations, configurations with canard surfaces for pitch axis control were selected which require artificial stabilization. A simple mechanical and hydraulic system is proposed which provides these stabilizing canard motions, which are superimposed on inputs applied by the pilot. This system is in operation during the primary manual and automatic modes as well as the alternate manual control mode. The alternate manual control mode is included to permit completion of the mission in the event that airplane electrical power is not available or the AFCS is inoperative.

d. Structural Load Factors

The airplane is designed to a limit manuevering load factor of 1. 6 g. The ultimate load factor is 1. 6 G x 1. 25 = 2. 0 G.

The gust load factor is identical to the above maneuvering load factor.

e. Crew Provisions

The flight crew for Weapon System 118P consists of only one man. Careful study of all of the systems involved indicates that one man can adequately perform all of the desired functions.

(1) Environment

The cockpit environment is based on the following assumptions:

Ventilated suit worn
Closed, recirculating ventilation system
Minimum possible leakage, of the order of 0.1 square inches equivalent area (CA = 0.1)
Leakage make-up to maintain cabin pressure from stored liquid gas

Greatest efficiency for the recirculation system is achieved with a low cabin altitude; 16,000 feet or 5.0 psia may be assumed. The required cockpit temperature will be established by equipment and instrumentation in the cockpit rather than by the man, since the ventilated suit provides protection for two hours at environmental temperatures up to 200°F or more.

For the Phase II-1/2 Airplane, the partial-pressure suit may be worn as a protection against possible decompression and in case of bail-out above 50,000 feet. Experience may show that survival of a decompression at 75,000 feet is possible by diving the airplane, without reliance on a pressure suit. Such a procedure will require a dive rate capability of the order of 2000 feet per second or better and the wearing of a full face helmet - permitting oxygen positive pressures up to 24 inches of water.

For the Phase III Airplane, the partial-pressure suit will be necessary to survive a decompression.

A full-pressure suit may be preferred on the basis of comfort and mobility, providing a suitable suit has achieved standardization by the time of mock-up of the airplane. The full-pressure suit has the advantage of permitting continuance of a mission at peak altitudes following a decompression, whereas, the tolerable duration wearing the partial-pressure suit is limited to a few minutes at or above 75,000 feet. The significance of this advantage depends on the feasibility of unpressurized flight from the standpoint of equipment operation.

(2) Visibility Requirements

Present indications are that the best method for achieving adequate vision in this design, with least amount of drag, is the use of a slightly raised transparent enclosure and a periscope. Several tests with gratifying results have been conducted utilizing periscopes. The periscope provides an exit pupil of adequate diameter and eye relief, thereby, permitting the pilot to maintain a normal body position and head movements. The field of view of a large enough angle to provide adequate forward and downward vision. The transparent canopy will allow forward, overhead, and side vision. In order that the proper orientation may be maintained by the pilot, overlap of the field of view by a minimum of 5 degrees between the periscope and transparent canopy will be achieved.

During taxiing, the periscope will allow the necessary forward and downward vision. The transparent canopy, with its large areas of side vision, will be used for side obstruction clearance. Once aligned on the runway, the periscope will provide adequate vision for take-off. Its field of view will provide a 30-degree cone of vision which is normally considered essential for visual reference. Another assistance to the pilot will be the projecting of the airspeed and altitude information on the periscope face, allowing the pilot to have the required information without shifting his field of view. Climb-out will be carried out by simply switching the vision from the periscope to the windshield area; once in the air both sources of vision can be utilized, the periscope for ground reference and the transparent area for all-around vision.

(3) Emergency Protection

Emergency protection for the pilot will consist of protection during crash landing, excessive maneuvers, and emergency egress, as well as the environment encountered due to altitude and velocity.

The personal equipment, that is the equipment worn by the pilot, will include the MB-3 partial-pressure suit, MB-5 helmet immersion or exposure suit, ventilated garment, and integrated harness torso suit.

Protection for crash landing will consist of the lap belt and shoulder harness fastened to the integrated harness. The harness in the integrated suit will protect the pilot from movement relative to the seat during crash landing, excessive maneuvers, and emergency in-flight egress. This suit will also position the parachute harness on the occupant for correct support during descent with the parachute.

The seat will be designed to provide protection of the occupant from limb flailing, wind blast, and tumbling during ejection and descent. The occupant will be retained in the seat during the entire escape sequence, landing in the seat. The occupant's arms will be retained within the seat envelope by large side guards, and the hands will be shielded from wind blast to help the occupant retain his grip on the trigger handgrips. The legs will be retained by side guards and one automatic quick-release yoke over each ankle. The ejection control will be located so that flight loads will not hamper the occupant from reaching and activating the jettison control. This control will be a single-movement device which will position the occupant for safe ejection, jettison the canopy, deploy the seat-attached main parachute, and eject the seat without further action by the escapee.

The tumbling protection will consist of a aerodynamic fins attached to the upper extremity of the seat. These fins will extend upon separation of the seat from the airplane.

An aneroid timer device will be used for automatic deployment of the main parachute. If escape is accomplished above 20,000 feet, the seat attached parachute will deploy upon reaching 20,000 feet; if escape is below 20,000 feet, the parachute will deploy 2-1/2 seconds after ejection. If the occupant wishes to leave the seat at any time with his emergency parachute and survival kit, a manual release handle is operated.

2. Power Plant

a. Engine Installation

(1) Phase II-1/2

Four afterburning General Electric X278 (135 percent X275A) engines are installed side by side in the aft fuselage. All airplane power supply accessories are mounted on separately cooled and lubricated, remotely located gear boxes. A quick-disconnect drive shaft transmits power from the single power take-off pad on each engine to its respective gear box. No accessories are located in the inaccessible nose bullet. A reversible hydraulic pump on each engine remote gear box will be utilized for starting each engine. Ground power supply will furnish power to the reversible hydraulic pump for starting.

Each of the four remote gear boxes will mount a single surface control and a single utility hydraulic pump. In addition one alternator will be mounted on two of the four gear boxes (total of 2 alternators). Constant-speed drives will be provided for the two alternators.

Advantages to be gained from using these remote gear boxes are as follows:

1. All accessories per engine will be located in one compartment thus making maintenance problems more simplified.

2. Accessibility problems will be decreased because no accessories are in the bullet nose.

3. Engine removal is simplified.

   a. Only a drive shaft will have to be disconnected as compared to disconnecting numerous hydraulic lines and electrical lines.

   b. Engine removal will be simplified, with no requirement for disconnect or removal of nose-mounted accessories.

4. All inflammable fluids are eliminated from the bullet nose, thus eliminating the possibility of air contamination and fire hazard due to this cause.

5. Accessories can be located in a cooler compartment, thereby reducing compartment fire hazard.

(2) Phase III

Four Aerojet ATR-2040, 103.1 percent size regenerative hydrogen-fueled air turbo rocket engines are installed side by side in the aft fuselage. All airplane power supply accessories are mounted on separately cooled and lubricated, remotely located gear boxes. A quick-disconnect drive shaft transmits power from the single power take-off pad on each engine to its respective gear box. No accessories will be mounted in the nose bullet. Ground engine starting will be accomplished in the following manner: Groun support equipment, consisting of a liquid hydrogen supply, high-pressure pump, and heat exchanger, will supply hydrogen to the engine turbine at 300°F to 400°F and 700 psia. The expansion of the hydrogen through the turbine will initiate operation of the compressor-turbine system, permitting ignition and burning of turbine exhaust hydrogen. This starting procedure is continued until engine idle speed is obtained. Operation is then switched to main engine operation, and fuel is fed to the engine from the airplane supply. Starting is estimated at under 30 seconds from the time conditioned hydrogen is supplied to turbine.

Each of the four remote gear boxes will mount a single surface control and a single utility hydraulic pump. In addition one alternator will be mounted in two of the four gear boxes (total of two alternators) and one hydraulic pump on each of the other two gear boxes to furnish power to the fuel system hydraulically powered fuel pumps.

Advantages to be gained from using the remote gear boxes are as follows;

1. Accessories per engine will be located in one compartment, thus making maintenance problems more simplified.

2. The accessibility problem will be decreased because no accessories are in the bullet nose.

3. Engine removal is simplified since only a drive shaft will have to be disconnected as compared to disconnecting numerous hydraulic lines and electrical lines.

4. All inflammable fluids are eliminated from the bullet nose, thus eliminating the possibility of air contamination and fire hazard due to this cause.

5. Accessories can be located in a cooler compartment, thereby reducing compartment fire hazard.

b. Air Induction System

(1) Phase II-1/2

Air to the four engines located in the aft fuselage of the Phase II-1/2 Airplane is supplied by two inlets located symmetrically on the sides of the fuselage. Air entering each inlet flows through a single duct which divides into two branches just forward of the compressor inlet station. The engines are provided with ejector nozzles, and the secondary air required plus all cooling air will be bled from the main engine duct. Ground cooling will be provided by reverse flow through auxiliary doors; the air being pumped forward into the engine duct and aft provides a means of exiting all of the excess air taken on board by the inlet but not needed by the engine, cooling, or bleed system.

The variable-geometry inlet design for the Phase II-1/2 Airplane is a two-dimensional, external-compression, internal-contraction type. For high-speed flight, the supersonic stream entering the inlet is partially decelerated through two external oblique shock waves formed by an external ramp. The entering stream is further decelerated to a low supersonic Mach number as a result of the internal contraction. The inlet design incorporates the use of porous-area suction on the ramp and over the engire duct surface for a short distance aft of the start of the cowl. Use of porous-area suction is utilized to prevent separation due to shock wave boundary layer interaction. The inlet has been geometrically arranged on the side of the fuselage to give the best possible angle of attack and yaw angle characteristics.

The inlet geometry and by-pass system will be automatically controlled in flight to give optimum performance. The variable internal ramp of the inlet will be controlled only as a function of Mach number. The by-pass system will automatically exit the correct amount of air to maintain low drag, high pressure recovery, and stable operation of the inlet.

(2) Phase III

Air to the four air-turbo rocket engines located in the aft fuselage of the Phase III Airplane is supplied by a single inlet located on the bottom of the fuselage. Air entering the inlet flows through a single duct to a station just upstream of the compressor inlet station where the main duct divides into four branches. All air needed for the cooling and the ejector nozzle are bled from the main engine duct. All excess air entering the inlet and not needed by the engine or auxiliary systems is exited through a by-pass.

The air induction system also includes a blowoff cowl extension. At low supersonic speeds (less than Mach 1.7) the inlet size (which is selected for operation at Mach 4.0) is approximately 300 percent too large. The blowoff cowl is provided to reduce the large inlet drag that results from the oversize inlet. The blowoff cowl extension converts the inlet to a fixed, normal shock inlet of proper size for operation upto about Mach 1.7. The cowl section is automatically jettisoned as a Mach number of 1.7 is reached.

Geometry and other details of the inlet and details of the inlet control system are similar to the Phase II-1/2 design. However, certain geometry changes were required because of the higher Mach number design.

c. Fuel System

(1) Phase II-1/2

The fuel system is designed to operate with land-based supersonic (LBSS) fuel. Total fuel quantity is approximately 21, 400 gallons and is contained in a forward insulated fuselage sump tank of 10, 140 gallons, an aft insulated fuselage transfer tank of 6, 560 gallons, and two wing tanks of 2, 350 gallons each. The tanks are integral with the airframe structure.

Fuel is supplied to the engine and transferred by hydraulic tank-mounted pumps. The tanks are pressurized to 15 psia with a liquid nitrogen system to avoid autoignition, to eliminate venting, and to provide an emergency engine feed system. CG is controlled by appropriate throttling of transfer from the aft tank.

Refueling is accomplished at a rate of 1200 gpm at 50 psi inlet pressure, for in-flight or ground operations.

(2) Phase III

The fuel system is designed to operate with liquid hydrogen. Total fuel quantity is approximately 101, 330 gallons and is contained in seven interconnected fuselage tanks. The tanks are insulated and separate from the structure.

Fuel is supplied to the engine by four hydraulically driven booster pumps in an aft sump tank. Fuel transfer is accomplished by gravity through check valve interconnectors which are limited through insulation to avoid loss. Maximum tank pressure is 35 psia.

Ground refueling is accomplished by a recirculating system from the forward to aft tank into a purged system. In-flight refueling is not provided.

3. Equipment

a. Navigation

Navigation is accomplished by a subsystem called the N5C, designed by the Autonetics Division of North American Aviation, Inc. This subsystem uses the inertial platform from the N5A subsystem, which has been extensively flight tested, and electronics from the N6B subsystem which is now in production for missile application.

The N5C navigation subsystem weighs 414 pounds and requires 10.7 cubic feet of space and 526 watts of electrical power. Its main components are the inertial platform and the associated electronic units, one of which is a digital computer.

The platform is isolated from angular flight motions by means of a four-axis gimbal arrangement. It is maintained normal to the earth's gravitational field by means of gyroscopes and torque computers. Inertial distance meters are mounted on this stabilized platform. (These are instruments which sense acceleration and yield its double integral, which is distance.) The output of an inertial distance meter is an amplitude-modulated carrier signal. This signal is demodulated so that it is suitable as an input to the digital differential analyzer which then performs the linear transformations necessary to put the position data into latitude and longitude coordinates.

The digital differential analyzer, into which a program for the mission has been inserted, also computes the correction signals to the automatic flight control unit. It is capable of computing paths consisting of, at most, three arcs of great-circle routes.

In addition to navigation data, this subsystem also furnishes timing marks; pitch, roll, and yaw angles for stabilization of camera platforms and radar data; and true ground velocity.

The navigation subsystem is also capable of automatically switching the reconnaissance subsystem on and off during a programmed flight.

b. Reconnaissance

(1) Radar

Scanning, Forward-looking Radar - for general area-mapping and gap-filling. This is a PPI radar of exceptional resolution capability (2700-foot ground resolution at 80 nautical miles). The PPI scope pictures provide for basic, over-all ground-mapping of the entire enemy territory. The pictures may also be used as comparison overlays in bomber guidance. In addition, this radar provides the high-resolution capability in the near range (approximately 550-foot ground resolution at 16 nautical miles) necessary to fill the gap left by the dual, high-resolution, side-looking radar.

High-resolution Side-looking radar - for detection of targets such as missile launching centers. Phase II-1/2 employs the APQ-56 equipment while the Phase III employs the advanced coherent Doppler radar techniques to provide ground resolution up to 200 feet at 70 miles. It will als provide records resembling good aerial photographs.

(2) Ferret

The ferret reconnaissance system is used for locating, detecting, and describing enemy ground radar stations, This system operates automatically and employs dozens of direction-finding and frequency-analyzing antennas to obtain complete information on enemy radars within ghe total frequency range of 30 to 70,000 megacycles. This information may be rapidly read out and correlated on the ground by computers such as the standard IBM 704.

(3) Photographic

The photographic reconnaissance system is used for target search and detailed target description. The system includes two automatically controlled, high-capability camera sets.

Search Cameras - approximately 24-inch focal length - capable of 20-foot ground resolution and 50-nautical-mile lateral coverage for detecting missile launchers, distinguisheing aircraft types, etc.

Detail Cameras - 48-inch focal length - capable of 4- to 5-foot ground resolution and 20-nautical-mile lateral coverage - for fine discrimination of target detail.

(4) Weather Reconnaissance

Potential outputs of the navigation subsystem and the airplane air data computer include complete weather data at flight level. The reconnaissance subsystem provides for complet in-flight recording of these data.

(5) Infrared Equipment

For detecting temperature differences on the ground and identifying underground or camouflaged installations. This equipment scans the ground, employing sensitive thermal detection devices. (The state of the art to permit efficient infrared work in the high-altitude, supersonic mission is still in doubt.)

c. Communications

Consistent with the operational use and the time schedule of Weapon System 118P, the general requirements of the CNI subsystem are minimum weight, high reliability, and the most advanced state-of-the-art development. The choice of equipment and installation is based on the assumption that the pilot and maintenance personal are of Air Force Test Center calibre, that maintenance and turnaround time are of secondary importance, and that there is adequate support of chosen equipment. Specifically, the functions of the CNI subsystem will be limited to the essential requirements of uhf communications, uhf automatic direction finding, stand-by altitude reference, identification air-to-air and ground-to-ground transponding equipment, radio distress beacon, and tape recorder.

Equipment that best fulfills the requirements of this weapon system, from both a functional and schedule standpoint, are as follows:

(1) AN/ARC-52

This equipment provides line-of-sight communication capable of conventional uhf, am, voice link with the present ground and air-borne facilities and is capable of operation with adf equipment. This equipment is an improvement over the AN/ARC-34 and was specifically designed and developed for space-premium, high-reliability installations. The basic characteristics of the AN/ARC-52 are a frequency range of 225. 0 to 399. 9 mc, 1750 available channels with 19 present channels and one guard channel, a power output of 20 watts minimum unmodulated power into a 50-ohm load, and a range up to 300 air-to-ground miles and 650 air-to-air miles (depending on altitude).

(2) AN/ARA-37

This equipment is an air-borne homing adapter used in conjunction with the command radio as a navigational aid. It provides right-left bearing-to-signal information and was designed and developed with the primary objectives of simplicity and lighteness of weight.

The basic characteristics of the AN/ARA-37, automatic direction finder are a frequency range of 225 to 400 mc, accuracy to 3 degrees under operational conditions, and right-left indication sensitivity increase as the station is approached.

(3) Attitude Reference

This equipment provides stand-by navigation. Study has indicated that pitch, roll, and azimuth can be obtained with much greater accuracy and less weight with a stable platform than with a combined vertical and directional gyro. The equipment will be tied in with the main inertial platform for accuracy checks and correction. Several systems providing these functions are under development by Lear, Kearfott, Kollsman, and Sperry. The accuracy characteristics of the attitude reference system are one-degree-per-hour drfft in azimuth and 5-degrees-per-hour drift in elevation.

(4) AN/APX-19 and AN/APX-27

The AN/APX-19 is an air-to-ground transpondor, and the AN/APX-27 is an air-to-air transpondor. These units automatically transmit an identification signal whenever properly challenged by friendly air or surface forces. They are also capable of identifying the weapon system as a specific airplane and of transmitting a distress code (SIF - selective identification function).

(5) AN/ART-27

This equipment transmits distress signals which indicate to rescue facilities the existence and location of the disabled airplane. It transmits alternately on hf for 5 minutes and uhf for 10 minutes for a period of 24 hours. It is ejected manually, on impact, from the airplane, if so selected, by a light-weight catapult system. It will operate satisfactory if ejected while air-borne, on the ground, or on the surface of a body of water. The system is normally in the "crash silent" condition and is provided with a manual override that requires the pilot to take positive action to activate the system.

(6) AN/ANH-5

This equipment is a lightweight tape recorder capable of recording audio signals from radio receivers or microphones. It provides a means of recording the pilot's oral descriptions of observations made during the mission for evaluation upon return to base. It has sufficient magnetic tape to permit recording on a selective basis throughout the mission. Automatic cutoff is provided when no audio signal is received.

d. <u>Aerial Refueling</u> (Phase II-1/2 Only)

An in-flight refueling system of the flying-boom type, having a transfer capacith of 1200 gpm, is provided to refuel the internal tanks. The receptacle is installed in the upper fuselage, forward of the wing. A switch is provided in the cockpit for actuating doors that cover the receptacle and energizing a light in the receptacle compartment to illuminate the receptacle.

B. GROUND SYSTEMS

1. Ground Servicing

Ground servicing of Weapon System 118P differs from the normal concept primarily in the reconnaissance pod equipment preflight and in the Phase III fuel servicing. The reconnaissance pod ground servicing. is handled apart from the airplane. Pod maintenance, data servicing, preflight, and postflight data correlation is accomplished adjacent to the ground data correlation vans. The mated (pod to airplane) check need be one to ensure the airplane-to-pod system operation. The airplane systems pertinent to reconnaissance operations can be functionally checked by the "go, no-go" system checker.

Fuel servicing and ground handling of the fuel servicing devices requires extreme care and preplanning in its operation, dut to the volatility of the fuel. Refueling requires gaseous nitrogen purging followed by gaseous hydrogen purging prior to the liquid hydrogen fueling operation. Because boiloff of the liquid hydrogen occurs in transit, reliquification is required prior to fueling. A combination reliquification and pumping device can be made as a portable unit. The gaseous nitrogen can be made by a portable generator, and the gaseous hydrogen is made available through the boiloff of the liquid hydrogen tanks. To date, some problems, pertinent to refueling, not fully resolved include: 1) designing pumps and stopcocks which would not permit temperature rise and contamination, 2) consideration of handling techniques and equipment to establish hazard-minimizing procedures, 3) consideration of ducting techniques to decrease liquid hydrogen boiloff losses in transfer from tank to airplane.

Ground servicing of the hydraulic systems is combined with system check-out, as accomplished by the hydraulic service equipment mounted on the airplane ground power unit.

The communication, navigation, and identification electronic equipment, as well as the inertial platform and electronics, use the "go, no-go" flight line testing and module equipment replacement concept. In addition, alignment of the inertial platform is either through autocollimation or by referencing a master azimuth, depending on the turnaround time requirements.

2. Training Aids

This contractor will make a detailed design analysis of the proposed weapon system design, with regard to estimations of new training equipment requirements imposed by the system and its subsystems, This analysis will consider all types and phases of training aids and equipment which will be necessary for the training of personnel in the operation, maintenance, and special technique requirements of Weapon System 118P.

a. Types of Training Aids

In the contractor's final analysis, based upon detailed design studies, all known training aid mediums will be carefully considered. A combination of the best possible mediums to aid instructor personnel in transmitting the knowledge necessary to effectively operate and maintain this weapon system will be recommended.

The main general types of training aids to be considered are:

Aircrew

Graphics
Procedure trainers
Mission simulator
Pilot transition airplane

Ground Crew

Graphics
Animated training aids
Operable training aids

b. Training Aids Support

All of the recommended training aids will with complete special tools, test equipment, ground hanc system and equipment technical orders, airplane handbo operating and maintenance instruction handbooks for eac.

c. Time-phasing Schedule

Paramount to the customer's best interest in the development of an effective training program is the timely delivery of the properly selected and accurately constructed training aid. Delivery must be accomplished well in advance of test site or operational delivery of the weapon system. In keeping with current Air Force regulations and this contractor's policy, all training aids will be delivered sufficiently in advance of the weapon system to effectively support initial maintenance and aircrew training programs, either at this contractor's facility or at Air Force installations in the field.

1.

R & D SCHEDULE

[X] SYSTEM [ ] PROJECT [ ] TASK [ ] OTHER

2. REPORTS CONTROL SYMBOL

3. DATE
4 June 1956

4. TITLE
SPECIAL RECONNAISSANCE AIRPLANE PHASE II 1/2

5. INITIAL [X]
CHANGE

6. NUMBER
118P

SCHEDULE — CALENDAR YEARS: 1956 (J A S O N D), 1957 (J F M A M J J A S O N D), 1958 (J F M A M J 3 4), 1959 (1 2 3 4), 1960 (1 2 3 4), 1961 (1 2 3 4), 1962 TO COMPL (1 2 3 4)

TITLE	PROJECT OR TASK NR	
a. General Operational Requirement	June 4, 1955	
b. System Requirement	Aug. 19, 1955	
c. Evaluation of Design Study	Aug. 19, 1955 June 4, 1956	
d. Development Study		
e. HQ USAF Approval		
f. Development Directive		
g. Contract Awarded		
h. Mock Up		
i. Engineering Drawing Release (Airframe)		
j. Fabrication Time, 1st Article (Airframe)		
k. Test Phase I		
l. Test Phase II		
m. Production Procurement Data Release		
n. Test Phase III		To June 1, 1962
o. Test Phase IV		This Information to be Submitted at a Later Date
p. Test Phase V		This Information to be Submitted at a Later Date
q. Test Phase VI		This Information to be Submitted at a Later Date
r. First Operational Aircraft		
s. Operational Suitability Test		This Information to be Submitted at a Later Date
t. Classification Action (AFR-80-6)	Sept. 15, 1955	
u. Acceptance Schedule		1 1 2 4 4 5 3
v. Operational Date		
w. Combat Ready Date		

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R & D SCHEDULE

☒ SYSTEM ☐ PROJECT ☐ TASK ☐ OTHER

3. DATE 4 JUNE 1958

4. TITLE SPECIAL RECONNAISSANCE AIRPLANE PHASE II 1/2

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6. NUMBER 118P

SCHEDULE — CALENDAR YEARS — 1962

TITLE	PROJECT OR TASK NR	1956						1957												1958								1959				1960				1961				TO COMPL			
		J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Acceptance Schedule																																		1	1	2	4	4	5	3			
Airframe																																											
Propulsion																																											
Engine																																											
Auto Flight																																											
Auto Navigator																																											
Reconnaissance																																											
Photo																																											
Search Photo																																											
Detail Photo																																											
Radar																																											
High Resolution																																											
Point Position Indicator																																											
Ferret																																											
Additional Equipment																																											
Standby Platform																																											
Direction Finder																																											
Crash Locator																																											
IFF																																											
Communications																																											
Tape Recorder																																											

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1.

R & D SCHEDULE

[X] SYSTEM [ ] PROJECT [ ] TASK [ ] OTHER

2. REPORTS CONTROL SYMBOL

3. DATE 4 JUNE 1956

4. TITLE SPECIAL RECONNAISSANCE AIRPLANE (PHASE II 1/2)

5. INITIAL [X] CHANGE

6. NUMBER 118P

SCHEDULE: TITLE	PROJECT OR TASK NR	CALENDAR YEARS (19__ J A S O N D; 19__ J F M A M J J A S O N D; 19__ J F M A M J 3 4; 19__ 1 2 3 4; 19__ 1 2 3 4; 19__ 1 2 3 4; TO COMPL 1 2 3 4)
Action Schedule		
1. Provide Funds and Direct Contractor to Initiate Engine Production Required for Program		
2. Provide Funds and Direct Contractor to Initiate Reconnaissance System Production Required for Program		This Information to be Furnished at a Later Date
3. Release Test Aircraft		
4. Establishe Funds Required and Budget to support Heavy Tooling		
5. Release Long Lead Time Items to support Production Build-Up		
a. Castings		
b. Forgings		

1.

R & D SCHEDULE

[X] SYSTEM [ ] PROJECT [ ] TASK [ ] OTHER

2. REPORTS CONTROL SYMBOL

3. DATE
4 JUNE 1956

4. TITLE
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5. INITIAL [X]
CHANGE

6. NUMBER
118P

SCHEDULE — CALENDAR YEARS

19: J A S O N D | 19: J F M A M J J A S O N D | 19: J F M A M J 3 4 | 19: 1 2 3 4 | 19: 1 2 3 4 | 19: 1 2 3 4 | TO COMPL: 1 2 3 4

TITLE	PROJECT OR TASK NR	CALENDAR YEARS
Propulsion		
Engine - Prototype		
a. Development Engineering		
b. Prototype Test		
c. Procurement Data Release		
d. Production Engineering Drawing Release		
e. Date Required		This Information Will be Furnished at a Later Date
f. Date Available		
Engine-Production		
a. Development Engineering		
b. Prototype Test		
c. Procurement Data Release		
d. Production Engineering Drawing Release		
e. Date Required		
f. Date Available		
Auto Flight		
a. Development Engineering		
b. Prototype Test		
c. Procurement Data Release		
d. Production Engineering Drawing Release		
e. Date Required		
f. Date Available		

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SCHEDULE — CALENDAR YEARS

TITLE	PROJECT OR TASK NR	19						19												19								19				19				19				TO COMPL			
		J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Auto Navigator																																											
a. Development Engineering																																											
b. Prototype Test																																											
c. Procurement Data Release																																											
d. Production Engineering																																											
Drawing Release																																											
e. Date Required				This Information will be Furnished at a Later Date																																							
f. Date Available																																											
Reconnaissance																																											
Photo - Search																																											
a. Development Engineering																																											
b. Prototype Test																																											
c. Procurement Data Release																																											
d. Production Engineering																																											
Drawing Release																																											
e. Date Required																																											
f. Date Available																																											
Reconnaissance																																											
Photo-Detail																																											
a. Development Engineering																																											
b. Prototype Test																																											
c. Procurement Data Release																																											
d. Production Engineering																																											
Drawing Release																																											
e. Date Required																																											
f. Date Available																																											

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R & D SCHEDULE

[X] SYSTEM [ ] PROJECT [ ] TASK [ ] OTHER

3. DATE: 4 JUNE 1956

4. TITLE: SPECIAL RECONNAISSANCE AIRPLANE (PHASE II 1/2)

5. INITIAL [X] CHANGE [ ]

6. NUMBER: 118P

SCHEDULE: TITLE	PROJECT OR TASK NR	CALENDAR YEARS: 19 (J A S O N D), 19 (J F M A M J J A S O N D), 19 (J F M A M J 3 4), 19 (1 2 3 4), 19 (1 2 3 4), 19 (1 2 3 4), TO COMPL (1 2 3 4)
Reconnaissance		
Radar - High Resolution		
a. Development Engineering		
b. Prototype Test		
c. Procurement Release		
d. Production Engineering		
Drawing Release		This Information will be Furnished at a Later Date
e. Date Required		
f. Date Available		
Reconnaissance		
Radar - Point Position Indicator		
a. Development Engineering		
b. Prototype Test		
c. Procurement Release		
d. Production Engineering		
Drawing Release		
e. Date Required		
f. Date Available		
Reconnaissance		
Ferret		
a. Development Engineering		
b. Prototype Test		
c. Procurement Release		
d. Production Engineering		
Drawing Release		
e. Date Required		
f. Date Available		

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R & D SCHEDULE

☒ SYSTEM ☐ PROJECT ☐ TASK ☐ OTHER

2. REPORTS CONTROL SYMBOL

3. DATE
4 JUNE 1956

4. TITLE
SPECIAL RECONNAISSANCE AIRPLANE (PHASE II 1/2)

5. INITIAL ☒
CHANGE

6. NUMBER
118P

SCHEDULE		CALENDAR YEARS
TITLE	PROJECT OR TASK NR	19: J A S O N D; 19: J F M A M J J A S O N D; 19: J F M A M J 3 4; 19: 1 2 3 4; 19: 1 2 3 4; 19: 1 2 3 4; TO COMPL: 1 2 3 4
Standby Platform		
a. Development Engineering		
b. Prototype Test		
c. Procurement Release		
d. Production Engineering		
Drawing Release		
e. Date Required		
f. Date Available		
		This Information to be Furnished at a Later Date
Direction Finder		
a. Development Engineering		
b. Prototype Test		
c. Procurement Release		
d. Production Engineering		
Drawing Release		
e. Date Required		
f. Date Available		
Crash Locator		
a. Development Engineering		
b. Prototype Test		
c. Procurement Release		
d. Production Engineering		
Drawing Release		
e. Date Required		
f. Date Available		

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5\. INITIAL ☒ CHANGE

6\. NUMBER 118P

SCHEDULE		CALENDAR YEARS																																									
TITLE	PROJECT OR TASK NR	19						19												19								19				19				19				TO COMPL			
		J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
IFF																																											
a. Development Engineering																																											
b. Prototype Test																																											
c. Procurement Release																																											
d. Production Engineering																																											
Drawing Release																																											
e. Date Required																																											
f. Date Available																																											
Communications																																											
a. Development Engineering																																											
b. Prototype Test																																											
c. Procurement Release																																											
d. Production Engineering																																											
Drawing Release																																											
e. Date Required																																											
f. Date Available																																											
Tape Recorder																																											
a. Development Engineering																																											
b. Prototype Test																																											
c. Procurement Release																																											
d. Production Engineering																																											
Drawing Release																																											
e. Date Required																																											
f. Date Available																																											

This Information will be Furnished at a Later Date

ARDC FORM 1 JUL 56 103 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE

1.

R & D SCHEDULE

[X] SYSTEM [ ] PROJECT [ ] TASK [ ] OTHER

2. REPORTS CONTROL SYMBOL

3. DATE

4. TITLE

SPECIAL RECONNAISSANCE AIRPLANE (PHASE III)

5. INITIAL [X]
CHANGE

6. NUMBER
118P

SCHEDULE		CALENDAR YEARS (1958 – 1963, TO COMPL.; m 1964)
TITLE	PROJECT OR TASK NR	
a. General Operational Requirement	June 4, 1955	
b. System Requirement	Aug. 19, 1955	
c. Evaluation of Design Study	June 4, 1956	
d. Development Study	May 1, 1957	
e. HQ USAF Approval	June 1, 1957	
f. Development Directive	July 1, 1957	
g. Contract Awarded	Aug. 1, 1957	
h. Mock Up		
i. Engineering Drawing Release (Airframe)		
j. Fabrication Time, 1st Article (Airframe)		
k. Test Phase I		
l. Test Phase II		
m. Production Procurement Data Release		
n. Test Phase III		To [illegible] 1, 1965
o. Test Phase IV		This Information to be Submitted at a Later Date
p. Test Phase V		This Information to be Submitted at a Later Date
q. Test Phase VI		This Information to be Submitted at a Later Date
r. First Operational Aircraft		
s. Operational Suitability Test		This Information to be Submitted at a Later Date
t. Classification Action	Sept. 15, 1955	
u. Acceptance Schedule		1 1 2 4 4 5 3
v. Operational Date		
w. Combat Ready Date		

ARDC FORM 1 JUL 56 103 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE

1.

R & D SCHEDULE

☒ SYSTEM ☐ PROJECT ☐ TASK ☐ OTHER

2. REPORTS CONTROL SYMBOL

3. DATE
4 JUNE 1958

4. TITLE
SPECIAL RECONNAISSANCE AIRPLANE (PHASE III)

5. INITIAL ☒
CHANGE

6. NUMBER
118P

SCHEDULE — CALENDAR YEARS (1958: J A S O N D; 1959: J F M A M J J A S O N D; 1960: J F M A M J 3 4; 1961: 1 2 3 4; 1962: 1 2 3 4; 1963: 1 2 3 4; 1964; TO COMPL: 1 2 3 4)

TITLE	PROJECT OR TASK NR	1962 1	1962 2	1962 3	1962 4	1963 1	1963 2	1963 3	1963 4	TO COMPL 1	TO COMPL 2	TO COMPL 3	TO COMPL 4
Acceptance Schedule			1	1	2	4	4	5	3				
Airframe													
Propulsion													
1. Engine - Prototype													
2. Engine - Production													
Auto Flight													
Auto Navigator													
Reconnaissance													
1. Photo													
a. Search Photo													
b. Detail Photo													
2. Radar													
a. High Resolution													
b. Point Position Indicator													
3. Ferret													
Additional Equipment													
Standby Platform													
Direction Finder													
Crash Locator													
IFF													
Communications													
Tape Recorder													

ARDC FORM 1 JUL 55 103 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE

1.

R & D SCHEDULE

[X] SYSTEM [ ] PROJECT [ ] TASK [ ] OTHER

2. REPORTS CONTROL SYMBOL

3. DATE 4 JUNE 1956

4. TITLE SPECIAL RECONNAISSANCE AIRPLANE (PHASE III)

5. INITIAL [X] CHANGE

6. NUMBER 118P

SCHEDULE		CALENDAR YEARS
TITLE	PROJECT OR TASK NR	19: J A S O N D; 19: J F M A M J J A S O N D; 19: J F M A M J 3 4; 19: 1 2 3 4; 19: 1 2 3 4; 19: 1 2 3 4; TO COMPL: 1 2 3 4
Action Schedule		
1. Provide funds and direct contractor in initiate engine production required for program		
2. Provide funds and direct contractor to initiate reconnaissance system production required for program		This Information to be Furnished at a Later Date
3. Release test aircraft		
4. Establish Fund required and budget to support heavy tooling		
5. Release long lead time items to support production build-up		
a. Castings		
b. Forgings		

ARDC FORM 103

PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE

1.

R & D SCHEDULE

[X] SYSTEM [ ] PROJECT [ ] TASK [ ] OTHER

2. REPORTS CONTROL SYMBOL

3. DATE 4 JUNE 1956

4. TITLE SPECIAL RECONNAISSANCE AIRPLANE (PHASE III)

5. INITIAL [X] CHANGE

6. NUMBER 118P

SCHEDULE — TITLE	PROJECT OR TASK NR	CALENDAR YEARS (19 J A S O N D / 19 J F M A M J J A S O N D / 19 J F M A M J 3 4 / 19 1 2 3 4 / 19 1 2 3 4 / 19 1 2 3 4 / TO COMPL 1 2 3 4)
Propulsion		
Engine - Prototype		
a. Development Engineering		
b. Prototype Test		
c. Procurement Data Release		
d. Production Engineering		
Drawing Release		This Information to be Furnished at a Later Date
e. Date Required		
f. Date Available		
Engine - Production		
a. Development Engineering		
b. Prototype Test		
c. Procurement Data Release		
d. Production Engineering		
drawing Release		
e. Date Required		
f. Date Available		
Auto Flight		
a. Development Engineering		
b. Prototype Test		
c. Procurement Data Release		
d. Production Engineering		
Drawing Release		
e. Date Required		
f. Date Available		

ARDC FORM 1 JUL 55 103 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE

1.

R & D SCHEDULE

[X] SYSTEM [ ] PROJECT [ ] TASK [ ] OTHER

2. REPORTS CONTROL SYMBOL

3. DATE 4 JUNE 1956

4. TITLE SPECIAL RECONNAISSANCE AIRPLANE (PHASE III)

5. INITIAL [X] CHANGE

6. NUMBER 118P

SCHEDULE		CALENDAR YEARS
TITLE	PROJECT OR TASK NR	19 (J A S O N D) · 19 (J F M A M J J A S O N D) · 19 (J F M A M J 3 4) · 19 (1 2 3 4) · 19 (1 2 3 4) · 19 (1 2 3 4) · TO COMPL (1 2 3 4)
Auto Navigator		
a. Development Engineering		
b. Prototype Test		
c. Procurement Data Release		
d. Production Engineering		
Drawing Release		
e. Date Required		
f. Date Available		
		This Information to be Furnished at a Later Date
Reconnaissance		
Photo-Search		
a. Development Engineering		
b. Prototype Test		
c. Procurement Data Release		
d. Production Engineering		
Drawing Release		
e. Date Required		
f. Date Available		
Reconnaissance		
Photo-Search		
a. Development Engineering		
b. Prototype Test		
c. Procurement Data Release		
d. Production Engineering		
Drawing Release		
e. Date Required		
f. Date Available		

1.

R & D SCHEDULE

[X] SYSTEM [ ] PROJECT [ ] TASK [ ] OTHER

2. REPORTS CONTROL SYMBOL

3. DATE 4 JUNE 1956

4. TITLE SPECIAL RECONNAISSANCE AIRPLANE (PHASE III)

5. INITIAL [X] CHANGE

6. NUMBER 118P

SCHEDULE: TITLE	PROJECT OR TASK NR	CALENDAR YEARS: 19 (J A S O N D), 19 (J F M A M J J A S O N D), 19 (J F M A M J 3 4), 19 (1 2 3 4), 19 (1 2 3 4), 19 (1 2 3 4), TO COMPL (1 2 3 4)
Reconnaissance		
Radar-High Resolution		
a. Development Engineering		
b. Prototype Test		
c. Procurement Release		
d. Production Engineering		
Drawing Release		
e. Date Required		
f. Date Available		This Information to be Furnished at a Later Date
Reconnaissance		
Radar - Point Position Indicator		
a. Development Engineering		
b. Prototype Test		
c. Procurement Release		
d. Production Engineering		
Drawing Release		
e. Date Required		
f. Date Available		
Reconnaissance		
Ferret		
a. Development Engineering		
b. Prototype Test		
c. Procurement Release		
d. Production Engineering		
Drawing Release		
e. Date Required		
f. Date Available		

ARDC FORM 1 JUL 55 103 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE

1.

R & D SCHEDULE

[X] SYSTEM [ ] PROJECT [ ] TASK [ ] OTHER

2. REPORTS CONTROL SYMBOL

3. DATE
4 JUNE 1956

4. TITLE
SPECIAL RECONNAISSANCE AIRPLANE (PHASE III)

5. INITIAL [X]
CHANGE

6. NUMBER
118P

SCHEDULE

CALENDAR YEARS: 19 (J A S O N D) | 19 (J F M A M J J A S O N D) | 19 (J F M A M J 3 4) | 19 (1 2 3 4) | 19 (1 2 3 4) | 19 (1 2 3 4) | TO COMPL (1 2 3 4)

TITLE	PROJECT OR TASK NR	CALENDAR YEARS
Steady Platform		
a. Development Engineering		
b. Prototype Test		
c. Procurement Release		
d. Production Engineering Drawing Release		
e. Date Required		
f. Date Available		
Direction Finder		This Information to be Furnished at a Later Date
a. Development Engineering		
b. Prototype Test		
c. Procurement Release		
d. Production Engineering Drawing Release		
e. Date Required		
f. Date Available		
Crash Finder		
a. Development Engineering		
b. Prototype Test		
c. Procurement Release		
d. Production Engineering Drawing Release		
e. Date Required		
f. Date Available		

1.

R & D SCHEDULE

☒ SYSTEM ☐ PROJECT ☐ TASK ☐ OTHER

2. REPORTS CONTROL SYMBOL

3. DATE 4 JUNE 1956

4. TITLE SPECIAL RECONNAISSANCE AIRPLANE (PHASE III)

5. INITIAL ☒ CHANGE

6. NUMBER 118P

SCHEDULE		CALENDAR YEARS																																									
TITLE	PROJECT OR TASK NR	19						19												19								19				19				19				TO COMPL			
		J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
IFF																																											
a. Development Engineering																																											
b. Prototype Test																																											
c. Procurement Release																																											
d. Production Engineering																																											
Drawing Release																																											
e. Date Required																																											
f. Date Available																																											
		This Information to be Furnished at a Later Date																																									
Communications																																											
a. Development Engineering																																											
b. Prototype Test																																											
c. Procurement Release																																											
d. Production Engineering																																											
Drawing Release																																											
e. Date Required																																											
f. Date Available																																											
Tape Recorder																																											
a. Development Engineering																																											
b. Prototype Test																																											
c. Procurement Release																																											
d. Production Engineering																																											
Drawing Release																																											
e. Date Required																																											
f. Date Available																																											

ARDC FORM 1 JUL 55 103 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE

1.

R & D TEST ANNEX

[X] SYSTEM [ ] PROJECT [ ] TASK [ ] OTHER

2. REPORTS CONTROL SYMBOL

PAGE 1 OF 6 PAGES

3. DATE 4 June 1956

4. TITLE SPECIAL RECONNAISSANCE AIRPLANE PHASE II-1/2

5. INITIAL [X] CHANGE [ ]

6. NUMBER 118P

7. RESP CENTER	8. PROJECT OFFICER	9. SUPPORTS (Sys or Proj)	10. CONTRACTOR	11. CONTR NR	12. PRIORITY AND PREC	13. SECURITY
			North American Aviation, Inc.			SECRET

14. ITEM NUMBER	15. TEST ITEM	16. TEST DESCRIPTION	17. TEST AGENCY AND SITE	18. TEST ITEM AVAILABLE	19. RQD TEST COMPL DATE
1.	Sub-system Development Tests of the Search Photographic Package, Detail Photographic Package, and the Digital Recorder.	Photographic packages will be installed and tested in a B-58 type aircraft for development tests in support of 118P program.	Sub-contractor @ Sub-contractor's test facilities.	April 1, 1960	July 1, 1961
2.	Sub-system Development Tests of the Radar Package (Low resolution - azimuth scan)	Radar package will be installed and tested in a B-58 type aircraft for development tests in support of 118P program.	Sub-contractor @ Sub-contractor's test facilities.	April 1, 1960	July 1, 1961
3.	Sub-system development tests of the Radar package (High resolution - side looking)	Radar Package will be installed and tested in a B-58 type aircraft for development tests in support of the 118P program.	Sub-contractor @ Sub-contractor's test facilities.	April 1, 1960	July 1, 1961
4.	Sub-system development tests of the Ferret package.	Ferret package will be installed and tested in a B-58 type aircraft for development tests in support of the 118P program.	Sub-contractor @ Sub-contractor's test facilities.	April 1, 1960	July 1, 1961

TEST CENTER APPROVAL

20. NAME	ORGANIZATION	DATE
21. NAME	ORGANIZATION	DATE

RESPONSIBLE CENTER APPROVAL

22. NAME	ORGANIZATION	DATE

ARDC FORM 105 1 JUL 55 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE.

1.

R & D TEST ANNEX

[X] SYSTEM [ ] PROJECT [ ] TASK [ ] OTHER

2. REPORTS CONTROL SYMBOL

PAGE 2 OF 6 PAGES

3. DATE 4 June 1956

4. TITLE: SPECIAL RECONNAISSANCE AIRPLANE

5. INITIAL [X] CHANGE [ ]

6. NUMBER: 118P

7. RESP CENTER:

8. PROJECT OFFICER:

9. SUPPORTS (Sys or Proj):

10. CONTRACTOR:

11. CONTR NR:

12. PRIORITY AND PREC:

13. SECURITY: SECRET

14. ITEM NUMBER	15. TEST ITEM	16. TEST DESCRIPTION	17. TEST AGENCY AND SITE	18. TEST ITEM AVAILABLE	19. RQD TEST COMPL DATE
5.	Airplane No. 1	A. Ground Tests and first 10 flight hours of Phase I Flight Testing	NAA @ Edwards AFFTC	Sept. 1, 1960	Oct. 31, 1960
		B. Remaining portion of Phase I Flight Testing (Approx. 35 hours)	NAA @ Palmdale	Nov. 1, 1960	Jan. 31, 1961
		C. Air Force Phase II Flight Test Evaluation	Air Force @ Edwards AFFTC	Feb. 1, 1961	March 31, 1961
		D. Phase III Flight Testing 1. Stability and Control 2. Power Plant and Performance 3. Automatic Flight Control	NAA @ Palmdale	April 1, 1961	May 15, 1963
		4. Air Force Evaluation	Air Force @ Palmdale		
6.	Airplane No. 2	A. CTCI (Contractor's Technical Compliance Inspection)	Air Force @ NAA	Jan. 1, 1961	Jan 31, 1961
		B. Installation of Flight Test Instrumentation	NAA @ NAA	Feb. 1, 1961	April 30, 1961
		C. Phase III Flight Testing 1. Power Plant & Performance 2. Stability and Control	NAA @ Palmdale	May 1, 1961	May 15, 1963
		3. Air Force Evaluation	Air Force @ Palmdale		

TEST CENTER APPROVAL

20. NAME | ORGANIZATION | DATE

21. NAME | ORGANIZATION | DATE

RESPONSIBLE CENTER APPROVAL

22. NAME | ORGANIZATION | DATE

ARDC FORM 1 JUL 55 105 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE.

1. R & D TEST ANNEX

[X] SYSTEM [ ] PROJECT [ ] TASK [ ] OTHER

2. REPORTS CONTROL SYMBOL

PAGE 3 OF 6 PAGES

3. DATE 4 June 1956

4. TITLE	5. INITIAL [X] / CHANGE	6. NUMBER
SPECIAL RECONNAISSANCE AIRPLANE		118P

7. RESP CENTER	8. PROJECT OFFICER	9. SUPPORTS (Sys or Proj)	10. CONTRACTOR	11. CONTR NR	12. PRIORITY AND PREC	13. SECURITY
			North American Aviation, Inc.			SECRET

14. ITEM NUMBER	15. TEST ITEM	16. TEST DESCRIPTION	17. TEST AGENCY AND SITE	18. TEST ITEM AVAILABLE	19. RQD TEST COMPL DATE
7.	Airplane No. 3	Phase III Flight Testing 1. Stability and Control 2. Structural Demonstration 3. Power Plant and Performance	NAA @ Palmdale	March 1, 1961	April 31, 1963
8.	Airplane No. 4	Phase III Flight Testing 1. Power Plant and Performance 2. Stability and Control	NAA @ Palmdale	April 1, 1961	April 30, 1963
9.	Airplane No. 5	Phase III Flight Testing 1. Automatic Flight Control 2. Inertial Navigation 3. Air Force Evaluation	NAA @ Palmdale Air Force @ Palmdale	May 1, 1961	April 30, 1963
10.	Airplane No. 6	Phase III Flight Testing 1. Electrical Systems, Antennas, Hydraulics Instruments, and Communication 2. Cabin Systems and De-icing 3. Air Force Evaluation	NAA @ Palmdale Air Force @ Palmdale	June 1, 1961	April 30, 1963

TEST CENTER APPROVAL

20. NAME	ORGANIZATION	DATE
21. NAME	**ORGANIZATION**	**DATE**

RESPONSIBLE CENTER APPROVAL

22. NAME	ORGANIZATION	DATE

ARDC FORM 1 JUL 55 105 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE.

1.

R & D TEST ANNEX

[x] SYSTEM [ ] PROJECT [ ] TASK [ ] OTHER

2. REPORTS CONTROL SYMBOL

PAGE 4 OF 6 PAGES

3. DATE 4 June 1956

4. TITLE SPECIAL RECONNAISSANCE AIRPLANE

5. INITIAL [X] CHANGE

6. NUMBER 118P

7. RESP CENTER	8. PROJECT OFFICER	9. SUPPORTS (Sys or Proj)	10. CONTRACTOR	11. CONTR NR	12. PRIORITY AND PREC	13. SECURITY

14. ITEM NUMBER	15. TEST ITEM	16. TEST DESCRIPTION	17. TEST AGENCY AND SITE	18. TEST ITEM AVAILABLE	19. RQD TEST COMPL DATE
11.	Airplane No. 7	Phase III Flight Testing 1. Search Photographic, Detail Photographic, and Digital Recorder 2. Cabin Systems and De-icing 3. Air Force Evaluation	NAA @ Palmdale Air Force @ Palmdale	July 1, 1961	April 30, 1963
12.	Airplane No. 8	Phase III Flight Testing 1. Radar Package (Low resolution - azimuth scan) and standby airplane for high resolution radar. 2. Ferret 3. Air Force Evaluation	NAA @ Palmdale Air Force @ Palmdale	July 1, 1961	April 30, 1963
13.	Airplane No. 9	Phase III Flight Testing 1. Radar Package (High resolution - side looking) and standby airplane for low resolution radar 2. Ferret 3. Air Force Evaluation	NAA @ Palmdale Air Force @ Palmdale	Aug. 1, 1961	April 30, 1963

TEST CENTER APPROVAL

20. NAME	ORGANIZATION	DATE
21. NAME	ORGANIZATION	DATE

RESPONSIBLE CENTER APPROVAL

22. NAME	ORGANIZATION	DATE

ARDC FORM 1 JUL 55 105 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE.

1.

R & D TEST ANNEX

[x] SYSTEM [ ] PROJECT [ ] TASK [ ] OTHER

2. REPORTS CONTROL SYMBOL

PAGE 5 OF 6 PAGES

3. DATE 4 June 1956

4. TITLE SPECIAL RECONNAISSANCE AIRPLANE

5. INITIAL [x] CHANGE

6. NUMBER 118P

7. RESP CENTER

8. PROJECT OFFICER

9. SUPPORTS *(Sys or Proj)*

10. CONTRACTOR

11. CONTR NR

12. PRIORITY AND PREC

13. SECURITY SECRET

14. ITEM NUMBER	15. TEST ITEM	16. TEST DESCRIPTION	17. TEST AGENCY AND SITE	18. TEST ITEM AVAILABLE	19. RQD TEST COMPL DATE
14.	Airplane No. 10	Phase III Flight Testing 1. Inertial Navigation System 2. Automatic Flight Control 3. Stability and Control 4. Air Force Evaluation	NAA @ Palmdale Air Force @ Palmdale	Sept. 1, 1961	April 30, 1963
15.	Airplane No. 11 12	Phase IV - Performance & Stability	Air Force @ Edwards AFFTC		
16.	Airplane No. 13 14	Phase VI - Functional Development	Air Force @ Edwards AFFTC		
17.	Airplane No. 15 16	Phase VII - Operational Suitability	Air Force @ Eglin Field APGC		
18.	Airplane No. 17	Phase V - All Weather	Ladd Field & Eglin Field		

TEST CENTER APPROVAL

20. NAME	ORGANIZATION	DATE
21. NAME	ORGANIZATION	DATE

RESPONSIBLE CENTER APPROVAL

22. NAME	ORGANIZATION	DATE

ARDC FORM 105 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE.

1.

R & D TEST ANNEX

[X] SYSTEM [ ] PROJECT [ ] TASK [ ] OTHER

2. REPORTS CONTROL SYMBOL

PAGE 6 OF 6 PAGES

3. DATE 4 June 1956

4. TITLE	5. INITIAL [X] CHANGE	6. NUMBER
SPECIAL RECONNAISSANCE AIRPLANE		118P

7. RESP CENTER	8. PROJECT OFFICER	9. SUPPORTS (Sys or Proj)	10. CONTRACTOR	11. CONTR NR	12. PRIORITY AND PREC	13. SECURITY
						SECRET

14. ITEM NUMBER	15. TEST ITEM	16. TEST DESCRIPTION	17. TEST AGENCY AND SITE	18. TEST ITEM AVAILABLE	19. RQD TEST COMPL DATE
19.	Airplane No. 18 19 20	To support Contractor's or the Air Force's Test Program to serve as possible replacements for assigned airplanes, and to handle additional testing requirements which always arise during complex programs of this nature.	Not Specified		

TEST CENTER APPROVAL

20. NAME	ORGANIZATION	DATE
21. NAME	ORGANIZATION	DATE

RESPONSIBLE CENTER APPROVAL

22. NAME	ORGANIZATION	DATE

ARDC FORM 1 JUL 55 105 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE.

1.

R & D TEST ANNEX

[X] SYSTEM [ ] PROJECT [ ] TASK [ ] OTHER

2. REPORTS CONTROL SYMBOL

PAGE 1 OF 5 PAGES

3. DATE 4 JUNE 1956

4. TITLE SPECIAL RECONNAISSANCE AIRPLANE PHASE III

5. INITIAL [X] CHANGE

6. NUMBER 118P

7. RESP CENTER	8. PROJECT OFFICER	9. SUPPORTS (Sys or Proj)	10. CONTRACTOR	11. CONTR NR	12. PRIORITY AND PREC	13. SECURITY
			North American Aviation, Inc.			Secret

14. ITEM NUMBER	15. TEST ITEM	16. TEST DESCRIPTION	17. TEST AGENCY AND SITE	18. TEST ITEM AVAILABLE	19. RQD TEST COMPL DATE
1.	Sub-system development tests of the Search Photographic Package, Detail Photographic Package, and the Digital Recorder.	Photographic packages will be installed and tested in a B-58 type aircraft for development tests in support of 118P program.	Sub-contractor @ sub-contractor's test facilities.	January 1, 1962	March 31, 1963
2.	Sub-system development tests of the Radar Package (low resolution-azimuth scan)	Radar package will be installed and tested in a B-58 type aircraft for development tests in support of 118P program.	Sub-contractor @ sub-contractor's test facilities.	January 1, 1962	March 31, 1963
3.	Sub-system development tests of the Radar Package (high resolution-side looking).	Radar package will be installed and tested in a B-58 type aircraft for development tests in support of the 118P program.	Sub-contractor @ sub-contractor's test facilities.	January 1, 1962	March 31, 1963
4.	Sub-system development tests of the ferret package.	Ferret package will be installed and tested in a B-58 type aircraft for development tests in support of the 118P program.	Sub-contractor @ sub-contractor's test facilities.	January 1, 1962	March 31, 1963

TEST CENTER APPROVAL

20. NAME	ORGANIZATION	DATE
21. NAME	ORGANIZATION	DATE

RESPONSIBLE CENTER APPROVAL

22. NAME	ORGANIZATION	DATE

ARDC FORM 1 JUL 56 105 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE.

1.

R & D TEST ANNEX

[X] SYSTEM [ ] PROJECT [ ] TASK [ ] OTHER

2. REPORTS CONTROL SYMBOL

PAGE 2 OF 5 PAGES

3. DATE 4 June 1956

4. TITLE	5. INITIAL [X] CHANGE	6. NUMBER
SPECIAL RECONNAISSANCE AIRPLANE		118P

7. RESP CENTER	8. PROJECT OFFICER	9. SUPPORTS (Sys or Proj)	10. CONTRACTOR	11. CONTR NR	12. PRIORITY AND PREC	13. SECURITY
			North American Aviation, Inc.			SECRET

14. ITEM NUMBER	15. TEST ITEM	16. TEST DESCRIPTION	17. TEST AGENCY AND SITE	18. TEST ITEM AVAILABLE	19. RQD TEST COMPL DATE
5.	Airplane No. 1	A. Ground tests and first 10 flight hours of Phase I Flight Testing.	NAA @ Edwards AFFTC	June 1, 1962	July 31, 1962
		B. Remaining portion of Phase I Flight Testing (Approx. 35 hours)	NAA @ Palmdale	August 1, 1962	October 31,1962
		C. Air Force Phase II Flight Test Evaluation.	Air Force @ Edwards AFFTC	November 1, 1962	Dec. 31, 1962
		D. Phase III Flight Testing 1. Stability and Control 2. Power Plant and Performance	NAA @ Palmdale	January 1, 1963	April 30, 1965
6.	Airplane No. 2	A. CTCI (Contractor's Technical Compliance Inspection)	Air Force @ NAA	October 1,1962	October 31,1962
		B. Installation of Flight Test Instrumentation	NAA @ NAA	Nov. 1, 1962	Jan. 31, 1963
		C. Phase III Flight Testing 1. Power Plant and Performance 2. Stability and Control 3. Air Force Evaluation	NAA @ Palmdale Air Force @ Palmdale	Feb. 1, 1963	April 30, 1965

TEST CENTER APPROVAL

20. NAME	ORGANIZATION	DATE

21. NAME	ORGANIZATION	DATE

RESPONSIBLE CENTER APPROVAL

22. NAME	ORGANIZATION	DATE

ARDC FORM 1 JUL 55 105 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE.

1.

R & D TEST ANNEX

[X] SYSTEM [ ] PROJECT [ ] TASK [ ] OTHER

1. REPORTS CONTROL SYMBOL

PAGE 3 OF 5 PAGES

3. DATE 4 June 1966

4. TITLE: SPECIAL RECONNAISSANCE AIRPLANE

5. INITIAL [X] CHANGE

6. NUMBER: 118P

7. RESP CENTER:

8. PROJECT OFFICER:

9. SUPPORTS (Sys or Proj):

10. CONTRACTOR: North American Aviation, Inc.

11. CONTR NR:

12. PRIORITY AND PREC:

13. SECURITY: SECRET

14. ITEM NUMBER	15. TEST ITEM	16. TEST DESCRIPTION	17. TEST AGENCY AND SITE	18. TEST ITEM AVAILABLE	19. RQD TEST COMPL DATE
7.	Airplane No. 3	Phase III Flight Testing 1. Stability and Control 2. Structural Demonstration 3. Power Plant and Performance 4. Air Force Evaluation	NAA @ Palmdale Air Force @ Palmdale	January 1, 1963	May 31, 1965
8.	Airplane No. 4	Phase III Flight Testing 1. Power Plant and Performance 2. Stability and Control	NAA @ Palmdale	Feb. 1, 1963	May 31, 1965
9.	Airplane No. 5	Phase III Flight Testing 1. Automatic Flight Control 2. Inertial Navigation 3. Stability and Control	NAA @ Palmdale	March 1, 1963	May 31, 1965
10.	Airplane No. 6	Phase III Flight Testing 1. Cabin Systems and De-icing 2. Electrical Systems, Antennas, Hydraulics, Instruments, Communications	NAA @ Palmdale	April 1, 1963	April 30, 1965

TEST CENTER APPROVAL

20. NAME	ORGANIZATION	DATE
21. NAME	ORGANIZATION	DATE

RESPONSIBLE CENTER APPROVAL

22. NAME	ORGANIZATION	DATE

ARDC FORM 1 JUL 55 105 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE.

R & D TEST ANNEX

[X] SYSTEM [ ] PROJECT [ ] TASK [ ] OTHER

PAGE 4 OF 5 PAGES

3. DATE: 4 June 1956

4. TITLE: SPECIAL RECONNAISSANCE AIRPLANE

5. INITIAL [X] CHANGE [ ]

6. NUMBER: 118P

7. RESP CENTER	8. PROJECT OFFICER	9. SUPPORTS (Sys or Proj)	10. CONTRACTOR	11. CONTR NR	12. PRIORITY AND PREC	13. SECURITY
			North American Aviation, Inc.			SECRET

14. ITEM NUMBER	15. TEST ITEM	16. TEST DESCRIPTION	17. TEST AGENCY AND SITE	18. TEST ITEM AVAILABLE	19. RQD TEST COMPL DATE
11.	Airplane No. 7	Phase III Flight Testing 1. Search photographic, detail photographic, and digital recorder 2. Cabin Systems and De-icing 3. Air Force Evaluation	NAA @ Palmdale Air Force @ Palmdale	May 1, 1963	April 30, 1965
12.	Airplane No. 8	Phase III Flight Testing 1. Radar Package (low resolution - azimuth scan) and standby airplane for high resolution radar. 2. Ferret 3. Air Force Evaluation	NAA @ Palmdale Air Force @ Palmdale	May 1, 1963	March 31, 1965
13.	Airplane No. 9	Phase III Flight Testing 1. Radar Package (high resolution - side looking) 2. Ferret 3. Air Force	NAA @ Palmdale	June 1, 1963	March 31, 1965
14.	Airplane No. 10	Phase III Flight Testing 1. Inertial Navigation 2. Automatic Flight Control	NAA @ Palmdale	July 1, 1963	April 30, 1965

TEST CENTER APPROVAL

20. NAME	ORGANIZATION	DATE

21. NAME	ORGANIZATION	DATE

RESPONSIBLE CENTER APPROVAL

22. NAME	ORGANIZATION	DATE

AEDC FORM 105, 1 JUL 55 — PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE.

1.

R & D TEST ANNEX

[X] SYSTEM [ ] PROJECT [ ] TASK [ ] OTHER

2. REPORTS CONTROL SYMBOL

PAGE 5 OF 5 PAGES

3. DATE 4 June 1956

4. TITLE SPECIAL RECONNAISSANCE AIRPLANE

5. INITIAL [X] CHANGE

6. NUMBER 118P

7. RESP CENTER	8. PROJECT OFFICER	9. SUPPORTS (Sys or Proj)	10. CONTRACTOR	11. CONTR NR	12. PRIORITY AND PREC	13. SECURITY
			North American Aviation, Inc.			SECRET

14. ITEM NUMBER	15. TEST ITEM	16. TEST DESCRIPTION	17. TEST AGENCY AND SITE	18. TEST ITEM AVAILABLE	19. RQD TEST COMPL DATE
15.	Airplane No. 11 12	Phase IV Flight Testing - Performance and Stability	Air Force @ Edwards AFFTC		
16.	Airplane No. 13 14	Phase IV Flight Testing - Functional Development	Air Force @ Edwards AFFTC		
17.	Airplane No. 15 16	Phase VII Flight Testing - Operational Suitability	Air Force @ Eglin Field APGC		
18.	Airplane No. 17	Phase V Flight Testing - All Weather	Ladd Field and Eglin Field		
19.	Airplane No. 18 19 20	To support the Contractor's or the Air Force's test program, to serve as possible replacements for assigned airplanes, and to handle additional testing requirements which always arise during complex programs of this nature.	Not specified.		

TEST CENTER APPROVAL

20. NAME	ORGANIZATION	DATE
21. NAME	ORGANIZATION	DATE

RESPONSIBLE CENTER APPROVAL

22. NAME	ORGANIZATION	DATE

ARDC FORM 105 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE.

1.

R & D TEST AND TEST SUPPORT AIRCRAFT ANNEX

[X] SYSTEM [ ] PROJECT [ ] TASK [ ] OTHER

2. REPORTS CONTROL SYMBOL

PAGE 1 OF 3 PAGES

3. DATE 4 June 1956

4. TITLE SPECIAL RECONNAISSANCE AIRPLANE PHASE II 1/2

5. INITIAL [X] CHANGE

6. NUMBER 118 P

7. ITEM NUMBER	8. AIRCRAFT REQUIRED QTY	TYPE, MODEL AND SERIES	SERIAL NUMBER	9. ASG CODE	10. MOD REQD	11. DATE REQD AND LOCATION	12. ESTIMATED RELEASE DATE	13. RECOMMENDED DISPOSITION	14. FLT HRS	15. EST COST
1 NAA	4	B-58 (Sub-contractor's sub-system development testing of the high resolution radar package, low resolution radar package, ferret package, search photographic package, and the detail photographic package.)		ES		April 1, 1960 @ NAA	June 30, 1960	Other Projects	FY-60 4-120 FY-61 1-120 2-120 3-120 4-120	
2 NAA	1	118P (Phase I, Phase II, and Phase III - Stability and Control, Power Plant Performance, and Auto matic Flight Control)	Airplane No. 1	BT		Oct. 1, 1960 @ NAA	May 15, 1963		FY-61 2-30 3-60 4-21 FY-62 1-21 2-21 3-21 4-21 FY-63 1-21 2-21 3-21 4-11	
3 NAA	1	118P (CTCI, Instrumentation for Flight Test, and Phase III Flight Tests - Power Plant, Performance, and Stability and Control)	Airplane No. 2	BT		Jan. 1, 1961 @ NAA	May 15, 1963		FY-61 3-0 4-14 FY-62 1-21 2-21 3-21 4-21 FY-63 1-21 2-21 3-21 4-11	
4 NAA	1	118P (Phase III Flight Tests - Stability and Control, Structural Demonstration, Power Plant, and Performance)	Airplane No. 3	BT		April 1, 1961 @ NAA	April 30,1963		FY-61 4-21 FY-62 1-21 2-21 3-21 4-21 FY-63 1-21 2-21 3-21 4-7	

1. R & D TEST AND TEST SUPPORT AIRCRAFT ANNEX

[x] SYSTEM [ ] PROJECT [ ] TASK [ ] OTHER

2. REPORTS CONTROL SYMBOL

PAGE 2 OF 3 PAGES

3. DATE 4 June 1956

4. TITLE SPECIAL RECONNAISSANCE AIRPLANE PHASE II-1/2

5. INITIAL [X] CHANGE

6. NUMBER 118P

7. ITEM NUMBER	8. AIRCRAFT REQUIRED QTY	TYPE, MODEL AND SERIES	SERIAL NUMBER	9. ASG CODE	10. MOD REQD	11. DATE REQD AND LOCATION	12. ESTIMATED RELEASE DATE	13. RECOMMENDED DISPOSITION	14. HRS FLT K	15. EST COST
5 NAA	1	118P (Phase III Flight Tests - Power Plant, Performance, and Stability and Control)	Airplane No. 4	BT		May 1, 1961 @ NAA	April 30,1963		FY-61 4-14 FY-62 1-21 2-21 3-21 4-21 FY-63 1-21 2-21 3-21 4-7	
6 NAA	1	118P	Airplane No. 5	BT		June 1, 1961	April 30, 1963		FY-61 4-7 FY-62 1-21 2-21 3-21 4-21 FY-63 1-21 2-21 3-21 4-7	
7 NAA	1	118P (Phase III Flight Tests - Electrical System, Antennas, Hydraulics, Instruments, Communications, Cabin Systems and De-icing.)	Airplane No. 6	BT		July 1, 1961 @ NAA	April 30,1963		FY-62 1-21 2-21 3-21 4-21 FY-63 1-21 2-21 3-21 4-7	
8 NAA	1	118P (Phase III Flight Testing - Search Photographic, Detail Photographic Digital Recorder, Cabin Systems and De-icing)	Airplane No. 7	BT		Aug. 1, 1961 @ NAA	April 30,1963		FY-62 1-18 2-27 3-27 4-27 FY-63 1-27 2-30 3-30 4-10	

1. **R & D TEST AND TEST SUPPORT AIRCRAFT ANNEX**

[X] SYSTEM [ ] PROJECT [ ] TASK [ ] OTHER

2. REPORTS CONTROL SYMBOL

PAGE 3 OF 3 PAGES

3. DATE 4 June 1956

4. TITLE SPECIAL RECONNAISSANCE AIRPLANE PHASE II-1/2

5. INITIAL [X] CHANGE

6. NUMBER 118P

7. ITEM NUMBER	8. AIRCRAFT REQUIRED QTY	TYPE, MODEL AND SERIES	SERIAL NUMBER	9. ASG CODE	10. COMD	11. DATE REQD AND LOCATION	12. ESTIMATED RELEASE DATE	13. RECOMMENDED DISPOSITION	14. FLT HRS	15. EST COST
9 NAA	1	118P (Phase III Flight Testing - Radar Package - Low resolution - azimuth scan - and ferret.)	Airplane No. 8	BT		Aug. 1, 1961 @ NAA	April 30,1963		FY-62 1-20 2-30 3-30 4-30 FY-63 1-30 2-30 3-30 4-10	
10 NAA	1	118P (Phase III Flight Testing - Radar Package - High resolution - side looking, and ferret.)	Airplane No. 9	BT		Sept. 1, 1961 @ NAA	April 30,1963		FY-62 1-10 2-30 3-30 4-30 FY-63 1-30 2-30 3-30 4-10	
11 NAA	1	118P (Phase III Flight Testing - Inertial Navigation, Automatic Flight Control, and Stability and Control.)	Airplane No. 10	BT		Oct. 1, 1961 @ NAA	April 30, 1963		FY-62 2-24 3-24 4-24 FY-63 1-24 2-24 3-24 4-8	

1. # R & D TEST AND TEST SUPPORT AIRCRAFT ANNEX

[X] SYSTEM [ ] PROJECT [ ] TASK [ ] OTHER

2. REPORTS CONTROL SYMBOL

PAGE 1 OF 3 PAGES

3. DATE 4 June 1956

4. TITLE SPECIAL RECONNAISSANCE AIRPLANE PHASE III

5. INITIAL [X] CHANGE

6. NUMBER 118P

7. ITEM NUMBER	8. AIRCRAFT REQUIRED QTY	TYPE, MODEL AND SERIES	SERIAL NUMBER	9. ASG CODE	10. MOD REQD	11. DATE REQD AND LOCATION	12. ESTIMATED RELEASE DATE	13. RECOMMENDED DISPOSITION	14. F HRS F CST	15. EST COST
1. NAA	4	B-58 (Sub-contractor's development testing of the high resolution radar package, low resolution radar package, search package, and the graphic package.)	Sub-system ferret photographic detail photo-	ES		Jan. 1, 1962 @ Sub-contractor's test facilities.	March 31, 1963	Other projects	FY-62 3-120 4-120 FY-63 1-120 2-120 3-120	
2. NAA	1	118P (Phase I, Phase II, and Phase III Stability and Control, Power Plant and Performance)	Airplane No. 1	BT		July 1, 1962 @ NAA	April 30, 1965		FY-63 1-30 2-60 3-21 4-21 FY-64 1-21 2-21 3-21 4-21 FY-65 1-21 2-21 3-21 4-7	
3. NAA	1	118P (CTCI, Instrumentation for Flight Test, and Phase III Flight Tests - Power Plant, Performance, and Stability and Control)	Airplane No. 2	BT		Oct. 1, 1962 @ NAA	April 30, 1965		FY-63 2-21 3-21 4-21 FY-64 1-21 2-21 3-21 4-21 FY-65 1-21 2-21 3-21 4-7	
4. NAA	1	118P (Phase III Flight Testing - Stability and Control, Structural Demonstration, Power Plant, and Performance.	Airplane No. 3	BT		Jan. 1, 1963 @ NAA	April 30, 1965		FY-63 3-21 4-21 FY-64 1-21 2-21 3-21 4-21 FY-65 1-21 2-21 3-21 4-7	

ARDC FORM 1 JUL 55 106 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE.

1.

R & D TEST AND TEST SUPPORT AIRCRAFT ANNEX

[X] SYSTEM [ ] PROJECT [ ] TASK [ ] OTHER

2. REPORTS CONTROL SYMBOL

PAGE 2 OF 3 PAGES

3. DATE
4 June 1956

4. TITLE
SPECIAL RECONNAISSANCE AIRPLANE PHASE III

5. INITIAL [X]
CHANGE

6. NUMBER
118P

7. ITEM NUMBER	8. AIRCRAFT REQUIRED QTY	TYPE, MODEL AND SERIES	SERIAL NUMBER	9. ASG CODE	10. MOD REQD	11. DATE REQD AND LOCATION	12. ESTIMATED RELEASE DATE	13. RECOMMENDED DISPOSITION	14. EST HRS	15. EST COST
5. NAA	1	118P (Phase III Flight Testing - Power Plant, Performance, and Stability and Control.)	Airplane No. 4	BT		Feb. 1, 1963 @ NAA	May 31, 1965		FY-63 3-14 4-21 FY-64 1-21 2-21 3-21 4-21 FY-65 1-21 2-21 3-21 4-14	
6. NAA	1	118P (Phase III Flight Testing - Automatic Flight Control, Inertial Navigation, and Stability and Control)	Airplane No. 5	BT		March 1, 1963 @ NAA	May 31, 1965		FY-63 3-7 4-21 FY-64 1-21 2-21 3-21 4-21 FY-65 1-21 2-21 3-21 4-14	
7. NAA	1	118P (Phase III Flight Testing - Cabin Systems and De-icing, Electrical System, Antennas, Hydraulics, Instruments, and Communications.)	Airplane No. 6	BT		April 1, 1963 @ NAA	May 31, 1965		FY-63 4-21 FY-64 1-21 2-21 3-21 4-21 FY-65 1-21 2-21 3-21 4-14	
8. NAA	1	118P (Phase III Flight Testing - Search Photographic, Detail Photographic Digitail Recorder, Cabin Systems and De-icing.)	Airplane No. 7	BT		May 1, 1963 @ NAA	April 30, 1956		FY-63 4-18 FY-64 1-27 2-27 3-27 4-27 FY-65 1-28 2-30 3-30 4-10	

1.
R & D TEST AND TEST SUPPORT AIRCRAFT ANNEX

[X] SYSTEM [ ] PROJECT [ ] TASK [ ] OTHER

2. REPORTS CONTROL SYMBOL

PAGE 3 OF 5 PAGES

3. DATE 4 June 1956

4. TITLE SPECIAL RECONNAISSANCE AIRPLANE PHASE III

5. INITIAL [X] CHANGE

6. NUMBER 118P

7. ITEM NUMBER	8. AIRCRAFT REQUIRED QTY	TYPE, MODEL AND SERIES	SERIAL NUMBER	9. ASG CODE	10. MOD REQD	11. DATE REQD AND LOCATION	12. ESTIMATED RELEASE DATE	13. RECOMMENDED DISPOSITION	14. F HRS F CST	15. EST COST
9. NAA	1	118P (Phase III Flight Testing - Radar Package - Low Resolution-Azimuth Scan and Ferret)	Airplane No. 8	BT		May 1, 1963 @ NAA	April 30,1965		FY-63 4-20 FY-64 1-30 2-30 3-30 4-30 FY-65 1-30 2-30 3-30 4-10	
10. NAA	1	118P (Phase III Flight Testing - Radar Package - High Resolution-Side Looking, and Ferret)	Airplane No. 9	BT		June 1, 1963 @ NAA	March 30,1965		FY-63 4-10 FY-64 1-30 2-30 3-30 4-30 FY-65 1-30 2-30 3-30	
11. NAA	1	118P (Phase III Flight Test - Inertial Navigation and Automatic Flight Control)	Airplane No. 10	BT		July 1, 1963 @ NAA	April 30,1965		FY-64 1-24 2-24 3-24 4-24 FY-65 1-24 2-24 3-24 4-8	

ARDC FORM 1 JUL 55 106 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE.

2. REPORTS CONTROL SYMBOL

1.

R & D MATERIEL ANNEX

☒ SYSTEM ☐ PROJECT ☐ TASK ☐ OTHER

2. REPORTS CONTROL SYMBOL

PAGE 1 OF 1 PAGES

3. DATE 4 June 1956

4. TITLE

SPECIAL RECONNAISSANCE AIRPLANE PHASE II-1/2

5. INITIAL ☒ CHANGE

6. NUMBER 118P

7. MATERIEL REQUIREMENTS *(Indicate Items in Columnar Form using Columns as cited in Examples)*

	FY-61	FY-62	FY-63
FUEL (JP-5)	2,804,000 gallons	15,020,000 gallons	13,660,000 gallons

FILM

For
Digital Recorder
Cameras
Radar
Ferret

ARDC FORM 1 JUL 55 107 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE.

1.

R & D MATERIEL ANNEX

[X] SYSTEM [ ] PROJECT [ ] TASK [ ] OTHER

2. REPORTS CONTROL SYMBOL

PAGE 1 OF 1 PAGES

3. DATE 4 June 1956

4. TITLE

SPECIAL RECONNAISSANCE AIRPLANE PHASE III

5. INITIAL [X] CHANGE

6. NUMBER 118P

7. MATERIEL REQUIREMENTS (Indicate Items in Columnar Form using Columns as cited in Examples)

	FY-63	FY-64	FY-65
FUEL (X-35)	94, 190, 000 gallons	241, 930, 000 gallons	206, 390, 000 gallons

FILM

For
Digital Recorder
Cameras
Radar
Ferret

ARDC FORM 107 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE.

1. **R & D FACILITIES ANNEX**

[X] SYSTEM [ ] PROJECT [ ] TASK [ ] OTHER

2. REPORTS CONTROL SYMBOL

PAGE 1 OF 1 PAGES

3. DATE 4 June 1956

4. TITLE SPECIAL RECONNAISSANCE AIRPLANE PHASE II-1/2

5. INITIAL [X] CHANGE [ ]

6. NUMBER 118P

7.	P - 100	P - 300	P - 694	OTHER	TOTAL
RESPONSIBLE CENTERS					
PARTICIPATING CENTERS					
CONTRACTOR					
OTHER					
SUB - TOTAL					
FY					
FY					
FY					
FY					
FY					
FY					
TO COMPLETE					

8. FACILITIES REQUIREMENTS **Airplane Flight Test**

Part V Existing Contractor Facilities - Other Pertinent Data

The general plan is to utilize the Contractor's existing Palmdale facility as the test base for the actual flight operations for the ten ws/118 flight test airplanes. The contractor's Los Angeles facility will be used in a supporting role and will require the use of existing warehousing, Labs, Shops and Instrumentation Design and Development Offices. No additional major structures are contemplated at Palmdale or LA hangar the W/s 118 flight test airplanes. It is planned to provide separate nose-in and tail sheds for each System 118 Airplane to protect maintenance crews from the weather. The main hangar will be used occasionally to house several airplanes for specialized maintenance & preflight operations. During the period Sept. 1960 thru April 1963 approx. 19,532 sq ft of ramp space will be required as hangar space for each airplane, totaling 195,320 sq ft for all ten airplanes. A total of approx. 429,600 sq ft of ramp space is currently available at the Palmdale Test Site, and approx. 339,000 sq ft of ramp space is currently available at LA to support this program.

Current Facilities Available Are Summarized Below

Los Angeles Facility

Hangar	36,000 sq ft
Warehousing, Labs, Shops, Instrumentation	22,000 sq ft
Total (LA)	58,000 sq ft
Ramp Area	339,000 sq ft
Land	13 Acres

Palmdale Facility

Hangar	59,000 sq ft
Office, Shops, Labs, Stockroom, Engineering Office, Instrumentation, Warehousing, Storage	55,000 sq ft
Total (Palmdale)	114,000 sq ft
Ramp Area	429,600 sq ft
Land	273 Acres

ARDC FORM 1 JUL 55 108 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE.

1. R & D FACILITIES ANNEX [x] SYSTEM [ ] PROJECT [ ] TASK [ ] OTHER				2. REPORTS CONTROL SYMBOL	
				PAGE 1 OF 1 PAGES	
				3. DATE 4 June 1956	
4. TITLE SPECIAL RECONNAISSANCE AIRPLANE PHASE III		5. INITIAL [x] CHANGE		6. NUMBER 118P	
7.	P - 100	P - 300	P - 694	OTHER	TOTAL
RESPONSIBLE CENTERS					
PARTICIPATING CENTERS					
CONTRACTOR					
OTHER					
SUB - TOTAL					
FY					
FY					
FY					
FY					
FY					
FY					
TO COMPLETE					

8. FACILITIES REQUIREMENTS Airplane Flight Test

Part V Existing Contractor Facilities - Other Pertinent Data

The general plan is to utilize the Contractor's existing Palmdale facility as the test base for the actual flight operation for the ten w/s 118 flight test airplanes. The Contractor's Los Angeles facility will be used in a supporting role and will require the use of existing warehousing, labs, shops and instrumentation design and development offices. No additional major structures are contemplated at Palmdale or LA to hangar the w/s 118 flight test airplanes. It is planned to provide separate nose-in and tail sheds for each System 118 Airplane to protect maintenance crews from the weather. The main hangar will be used occasionally to house several airplanes for specialized maintenance and preflight operations. Special fuel storage and handling facilities will also be required. During the period June 1962 thru April 1965 approx. 36,200 sq ft of ramp space will be required as hangar space for each airplane, totaling 362,000 sq feet for all ten airplanes. A total of approx 429,600 sq ft of ramp space is currently available at the Palmdale Test Site, and approx. 339,000 sq ft of ramp space is currently available at LA to support this program.

Current Facilities Available Are Summarized:

Los Angeles Facility

Hangar	36,000 sq ft
Warehousing, Labs, Instrumentation, Shops	22,000 sq ft
Total	58,000 sq ft
Ramp Area	339,000 sq ft
Land	13 acres

Palmdale Facility

Hangar	59,000 sq ft
Offices, Shops, Labs, Stockroom, Engineering Office, Instrumentation, Warehousing, Storage	55,000 sq ft
Total	114,000 sq ft
Ramp Area	429,600 sq ft
Land	273 acres

ARDC FORM 1 JUL 55 108 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE.

1\.

R & D CONTRACT FUNDS ANNEX

[X] SYSTEM [ ] PROJECT [ ] TASK [ ] OTHER

2\. REPORTS CONTROL SYMBOL

PAGE OF PAGES

3\. DATE 4 JUNE 1956

4\. TITLE SPECIAL RECONNAISSANCE AIRPLANE PHASE II-1/2 AND PHASE III

5\. INITIAL [X] CHANGE

6\. NUMBER

7. ITEM	8. PROJ OR TASK NR	9. END ITEM CAT	10. CONTRACT NUMBER	11. BPSN	12. PREV YRS		13. FY		14. FY		15. FY		16. FY		17. TO COMPL	
					600	OTHER	600	OTHER	600	OTHER	600	OTHER	600	OTHER	600	OTHER
THIS INFORMATION IS NOT AVAILABLE AT THIS TIME																
TOTAL																

ARDC FORM 110 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE

1.

R & D MANPOWER ANNEX

[X] SYSTEM [ ] PROJECT [ ] TASK [ ] OTHER

2. REPORTS CONTROL SYMBOL

PAGE OF PAGES

3. DATE

4 JUNE 1956

4. UNCLASSIFIED TITLE

SPECIAL RECONNAISSANCE AIRPLANE PHASE II-1/2 AND III

5. INITIAL [X]
CHANGE

6. NUMBER

7. ORG COMP CODE	8. ORGANIZATION TITLE	9. TYPE ORG	10. ACTUAL MAN-QTRS LAST QTR	11. PROJECTED DIRECT MAN-YEARS						
				FY 19		FY 19		FY 19	FY 19	TO COMPL
				AVAL	RQRD	AVAL	RQRD	RQRD	RQRD	RQRD

THIS INFORMATION NOT AVAILABLE AT THIS TIME

ARDC FORM 1 JUL 55 109 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE

1.

R & D MANPOWER PROGRAM SUMMARY

[X] RESEARCH AND DEVELOPMENT [ ] TEST [ ] TECHNICAL SUPPORT

2. REPORTS CONTROL SYMBOL

PAGE OF PAGES

3. DATE 4 JUNE 1956

4. CENTER SPECIAL RECONNAISSANCE AIRPLANE PHASE II-1/2 AND III

5. ORGANIZATIONAL COMPONENT TITLE

6. ORGANIZATIONAL CODE

7. [ ] RECAPITULATION [ ] INDIRECT [ ] DIRECT

8. MANPOWER CATEGORY	9. CODE NUMBER	10. ACTUAL MAN-QTRS LAST QTR	11. PROJECTED MAN-YEARS FY 19 AVAL	FY 19 RQRD	FY 19 AVAL	FY 19 RQRD	FY 19 RQRD	FY 19 RQRD	TO COMPL RQRD
		THIS INFORMATION NOT AVAILABLE AT THIS TIME							

ARDC FORM 1 JUL 55 109 A PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE.

1.

R & D PERSONNEL AND TRAINING ANNEX

[X] SYSTEM [ ] PROJECT [ ] TASK [ ] OTHER

2. REPORTS CONTROL SYMBOL

PAGE 1 OF 2 PAGES

3. DATE 4 June 1956

4. TITLE SPECIAL-RECONNAISSANCE AIRPLANE PHASE II 1/2 AND PHASE III
This report is incomplete as Air Force Flight Test schedule is not available at this date.

5. INITIAL [X] CHANGE

6. NUMBER 118P

7. ORGANIZATION TITLE	8. TYPE ORGANIZATION	9. JOB TITLE	10. MAN-YEARS REQUIRED			11. AFSC OR CIVILIAN CLASS SERIES CODE	12. RATED OR NON-RATED	13. PERIOD REQUIRED	
			MILITARY	CIVILIAN	MIL OR CIV			FY	QUARTER
APCC	T	Project Officer	(05)				R		
		Project engineer pilot	(04)				R		
		Crew Chief	(E7)			4317E	N		
		Asst Crew Chief	(E6)			4317E	N		
		A/C Mechanics	(E5)			4315E	N		
		A/C Mechanics	(E4)			4315E	N		
		Jet Eng Tech.	(E6)			43270	N		
		Jet Eng Mech	(E4)			43250	N		
		A/C Elect Tech	(E6)			42370	N		
		A/C Elect Rprmn	(E4)			42350	N		
		A/C Hyd Rprmn	(E5)			42152	N		
		A/C Electronic Nav Eq Mnt Tec	(E6)			30171	N		
		A/C Electronic Nav Eq Rprmn	(E5)			30151	N		
		A/C Electronic Nav Eq Rprmn	(E4)			30151	N		
		A/C Rad Maint Tech	(E6)			30170	N		
		A/C Radio Rprmn Command	(E4)			30150A	N		

14. For additional Personnel Data use blank sheet and attach. (SEE ATTACHED SHEET)

ARDC FORM 1 JUL 55 115 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE.

ARDC 1 JUL 55 115 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE.

R & D PERSONNEL AND TRAINING ANNEX

[X] SYSTEM [ ] PROJECT [ ] TASK [ ] OTHER

2. REPORTS CONTROL SYMBOL

PAGE 2 OF 2 PAGES

3. DATE 4 June 1958

4. TITLE SPECIAL-RECONNAISSANCE AIRPLANE PHASE II 1/2 AND PHASE III

5. INITIAL [X] CHANGE

6. NUMBER 118P

7. ORGANIZATION TITLE	8. TYPE ORGANIZATION	9. JOB TITLE	10. MAN-YEARS REQUIRED: MILITARY	CIVILIAN	MIL OR CIV	11. AFSC OR CIVILIAN CLASS SERIES CODE	12. RATED OR NON-RATED	13. PERIOD REQUIRED: FY	QUARTER
APGC	T	A/C Radio Nav Equip Rprmn	(E4)			30150C	N		
		Instrumentation Technician	(E6)			31370	N		
		Photo Equip Repair Tech.	(E6)			40270	N		
		Aer Photo Tech	(E6)			23170	N		
		Aer Photographer	(E4)			23153	N		
		*Aircraft Electronic reconnaissance equip. tech.	(E7)			30174	N		
		*Aircraft Electronic reconnaissance equipment rprmn.	(E5)			30154	N		
		*Automatic flight control system mech	(E5)			42450	N		

*These AFSC's do not at present appear in AFM 35-1. However the development of this weapon system at the present time indicates a need for specialists to be furnished in the fields indicated. As the development of 118P progresses a more specific explanation of the requirements for these AFSC's will be submitted.

NOTE: Factory training will be required in the following area:

Maintenance
Electric-Electronic
Hydraulics
HATR 2040
N5C Autonavigator
Liquid Hydrogen Handling
Photo Equipment
Radar Reconnaissance
Auto Flight Control

14. For additional Personnel Data use blank sheet and attach.

ARDC FORM 1 JUL 55 115 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE.

ARDC FORM 115

(BLOCK 14 SUPPLEMENT)

It is not expected that there will be any unusual civilian recruiting requirements imposed by Weapon System 118P.

New skill requirements will be offered by the advanced electronic equipment involved in the radar reconnaissance and navigation systems. Handling of liquid hydrogen fuel and servicing of the aircraft will also present new problems on the Phase III version.

An unusual job hazard will be presented by the liquid hydrogen fuel used in the Phase III version. Production, storage in large quantities and [illegible] vicint of this fuel will be a new experience for nearly all personnel required to handle it. It will be necessary to conduct considerable training for those people who will be servicing the fuel or powerplant system, or working the vicinity of this equipment.

Due to the advanced nature of the electronic equipment installed on this weapon it is recommended that the new AFSC's indicated in block 9 page 2 be considered for inclusion in the Air Force personnel structure.

1.

R & D COST ESTIMATE RECAPITULATION

☒ SYSTEM ☐ PROJECT ☐ TASK ☐ OTHER

2. REPORTS CONTROL SYMBOL

PAGE OF PAGES

3. DATE 4 JUNE 1956

4. UNCLASSIFIED TITLE SPECIAL RECONNAISSANCE AIRPLANE PHASE II-1/2 AND III

5. INITIAL ☒ CHANGE

6. NUMBER

ITEM		A. PREVIOUS YEARS		B. FISCAL YEAR		C. FISCAL YEAR		D. FISCAL YEAR		E. TO COMPLETE	
		600	OTHER	600	OTHER	600	OTHER	600	OTHER	600	OTHER
7. CONTRACT	A. TOTAL										
	B. AVAILABLE										
	C. NEW REQ										
8. MATERIEL	A. TOTAL			THIS INFORMATION NOT AVAILABLE AT THIS TIME							
	B. AVAILABLE										
	C. NEW REQ										
9. FACILITIES											
10. MANPOWER											
11. TRAINING											
12. TEST ITEMS											
13. TEST SUPPORT AIRCRAFT											
14. SUBTOTAL											
15. TOTAL											

ARDC FORM 1 JUL 55 116 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE.

1.

R & D TEST ITEM ANNEX

[X] SYSTEM [ ] PROJECT [ ] TASK [ ] OTHER

2. REPORTS CONTROL SYMBOL

PAGE OF PAGES

3. DATE

4 JUNE 1956

4. TITLE

SPECIAL RECONNAISSANCE AIRPLANE PHASE II-1/2 AND III

5. INITIAL [X]
CHANGE

6. NUMBER

7. ITEM NUMBER	8. FISCAL YEAR REQ	9. NOMENCLATURE	10. QUANTITY	11. UNIT COST	12. OTHER COST	13. TOTAL COST
		THIS INFORMATION NOT AVAILABLE AT THIS TIME				

ARDC FORM 1 JUL 55 125 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE.

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 88TH AIR BASE WING (AFMC)
WRIGHT-PATTERSON AIR FORCE BASE OHIO

18 Dec 2007

88 CG/SCCMF
3810 Communications Blvd
Wright-Patterson AFB OH 45433-7802

Defense Technical Information Center
Attn: Ms. Kelly Akers (DTIC-R)
8725 John J. Kingman Rd, Suite 0944
Ft Belvoir VA 22060-6218

Dear Ms. Akers

This concerns Technical Report AD158502, Special Reconnaissance Airplane Weapon System 118P, 9 Sep 1956,

Subsequent to WPAFB FOIA Control Number 06-648LK, the current distribution statement: "Distribution authorized to DoD only; Proprietary Information; 09 Sep 1956. Other requests shall be referred to Department of the Air Force, Attn: Public Affairs Office (Information Management) Washington, DC 20330." **is no longer applicable**.

The document has been reviewed by the Aeronautical Systems Center STINFO Officer within the Reconnaissance Systems Wing, 303 AESW/EN, Wright-Patterson AFB and it has been determined that the distribution statement should be changed to statement A (publicly releasable). The record is fully releasable to the public.

Point of contact is Lynn Kane at (937) 522-3091.

Sincerely

Sheree M. Coon

SHEREE COON
Freedom of Information Act Manager
Management Services Branch
Base Information Management Division

Attachments
1. FOIA Request
2. Cover sheets of AD158502
3. Full Citation of AD158502
4. Copy of AFMC Form 559
5. USAF Ltr to Contractor
6. Contractor Response Email to USAF